Section 9. Physical and Chemical Properties

Appearance:OPAQUE WHITE LIQUID
Odor: MILD AMMONIA
pH: 8.5 TO 9.5 (1% SOL.)
Solubility in Water:TRANSLUCENT WHITE EMULSION
Specific Gravity @ 25C:0.987 g/ml
Boiling Point: 212F
Flash Point: >212F

Viscosity @ 25C: 1500 cps
Melting Point: NOT DETERMINED
Freezing Point: NOT DETERMINED
Vapor Pressure @ 25C: NOT DETERMINED
Evaporation Rate: NOT DETERMINED

Section 10. Stability and Reactivity

Chemical Stability:
STABLE UNDER RECOMMENDED STORAGE CONDITIONS.

Conditions to Avoid:
NONE DETERMINED.

Incompatible Materials:
STRONG OXIDIZERS.

Hazardous Decomposition Products:
CARBON DIOXIDE, CARBON MONOXIDE AND VARIOUS HYDROCARBONS MAY BE RELEASED DURING A FIRE.

Possibility of Hazardous Reactions:
NONE ARE KNOWN.

Section 11. Toxicological Information

Acute Health Effects:

Eyes:
WILL CAUSE MODERATE TO SEVERE EYE IRRITATION.

Skin:
PROLONGED OR REPEARTED CONTACT WITH THE UNDILUTED PRODUCT MAY CAUSE MODERATE SKIN IRRITATION AND DRYNESS.

Ingestion:
SWALLOWING THIS PRDOUCT MAY CAUSE GASTROINTESTINAL IRRITATION, DIARRHEA, NAUSEA, AND VOMITING.

Inhalation:
BREATHING VAPORS AT ELEVATED TEMPERATURES MAY CAUSE RESPIRATORY IRRITATION.

Chronic Health Effects:
NONE KNOWN OR EXPECTED.

Toxicity Values:

No Data Available

Section 12. Ecological Information

Ecotoxicity:
NO DATA AVAILABLE.

Persistence and Degradability:
NO DATA AVAILABLE.

Bioaccumulative Potential:
NO DATA AVAILABLE.

Mobility in Soil:
NO DATA AVAILABLE.

Other Adverse Effects:
NO DATA AVAILABLE.

Section 13. Disposal Considerations

DISPOSE OF ONLY BY METHODS APPROVED BY AND USED IN ACCORD WITH LOCAL, STATE AND FEDERAL REGULATIONS.

Section 14. Transportation Information

DOT Road Shipment Information (49 CFR 172.101):
NON REGULATED

Ocean Shipment (IMDG):
NON REGULATED

Air Shipment (IATA):
NON REGULATED

Section 15. Regulatory Information

TSCA Status: ALL COMPONENTS OF THIS PRODUCT ARE LISTED IN THE TSCA INVENTORY.

EPA SARA Title III Chemical Listings

Section 302 Extremely Hazardous Substances:
NO

Section 304 CERCLA Hazardous Substances:
NO

Section 311/312 Hazard Class:
Acute: Yes
Chronic: No
Fire: No
Pressure: No
Reactive: No

Section 313 Toxic Chemicals:
None

Other Regulatory Information:
NO DATA AVAILABLE.

Section 16. Other Information

HMIS Profile:	Health:	Flammability:	Reactivity:	Personal Protection:
	1	1	0	B

General Information
ATTENTION: DO NOT REUSE CONTAINER FOR PURPOSES OTHER THAN ORIGINALLY INTENDED. EMPTIED CONTAINER RETAINS VAPOR OR PRODUCT RESIDUE. DO NOT REUSE UNLESS CONTAINER IS THOROUGHLY RECONDITIONED.FOR INDUSTRIAL USE ONLY. USE ONLY ACCORDING TO INFORMATION CONTAINED IN THE TECHNICAL BULLETIN AND SDS.

The information and recommendations presented herein are presented in good faith and are believed to be correct as of the date hereof. The manufacturer/supplier makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving the information will make their own determinations as to its suitability for their purposes prior to use. In no event will the manufacturer/supplier be responsible for damages or any nature whatsoever, resulting from the use of or reliance upon this information. NO REPRESENTATIONS OR WARRANTIES, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

Date of Issue:
06/18/2015
Revision Number:
Initial
Revision Date:

Product Number:
10450

This is the last Page

MATERIAL SAFETY DATA SHEET

DATE PREPARED:09/18/2009
MAYOQUEST 1860

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: MAYOQUEST 1860
PRODUCT CODE: 31860

MANUFACTURER
Compass Chemical International, LLC
5544 Oakdale Road, S.E.
Smyrna, GA 30082
Customer Service: 888-962-6296

24 HR. EMERGENCY TELEPHONE NUMBERS
CHEMTREC (800) 424-9300
Emergency Phone (888) 962 6296

2. COMPOSITION / INFORMATION ON INGREDIENTS

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse.

This product is hazardous as defined in 29 CFR 1910.1200., based on the following composition:

Chemical Name	Wt.%	CAS#
Hydrochloric Acid	10 - 15	7647-01-0
DETPMP (diethylenetriaminemethlemephosphonic acid)	45 - 55	15827-60-8

Components with Exposure Limits:

		EXPOSURE LIMITS					
		OSHA PEL		ACGIH TLV		Supplier OEL	
		ppm	mg/m^3	ppm	mg/m^3	ppm	mg/m^3
Hydrochloric Acid	TWA	---	---	---	---	---	---
	STEL	5	7	2	2.98	---	---

COMMENTS:
Values under STEL are "ceiling limits"
Immediate Dangerous to Life or Health
Hydrochloric Acid IDLH: 50 ppm

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Clear, amber liquid

IMMEDIATE CONCERNS:

DANGER!

Causes eye, skin and digestive tract burns.

Mist may cause respiratory tract burns.

POTENTIAL HEALTH EFFECTS

EYES: Corrosive; causes eye burns and permanent tissue damage.

SKIN: Corrosive; causes permanent skin damage.

INGESTION: Corrosive to mouth, esophagus and stomach.

INHALATION: May cause burns to the respiratory tract.

CANCER STATEMENT: This product (or any component at a concentration of 0.1% or greater) is not listed by the NTP, IARC, OSHA or EPA as a carcinogen.

4. FIRST AID MEASURES

EYES: Immediately flush eyes with large amounts of water for at least 15 minutes while frequently lifting the upper and lower eyelids. Get immediate medical attention.

SKIN: Immediately wash with large amounts of water; use soap if available. Remove contaminated clothing, including shoes, after washing has begun. Get immediate medical attention.

INGESTION: If swallowed, DO NOT induce vomiting. If individual is conscious, give milk or water to dilute stomach contents. Keep warm and quiet. Get prompt medical attention. DO NOT attempt to give anything by mouth to an unconscious person.

INHALATION: If symptoms develop, remove individual to fresh air and get medical attention. If breathing is difficult, give oxygen. If breathing stops, give artificial respiration

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: >200°F

FLAMMABLE LIMITS: Not Available

AUTOIGNITION TEMPERATURE: Not Available

EXTINGUISHING MEDIA: Use extinguishing agent suitable for type of surrounding fire.

FIRE FIGHTING PROCEDURES: Use water spray to cool fire exposed surfaces and to protect personnel. Isolate 'fuel' supply from fire.

FIRE FIGHTING EQUIPMENT: As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

ENVIRONMENTAL PRECAUTIONS

WATER SPILL: Prevent additional discharge of material, if possible to do so without hazard. Warn occupants and downstream/downwind areas of fire/corrosive release hazard and request all to stay clear. This material os water soluble/dispersible and may not be recoverable.

LAND SPILL: Prevent additional discharge of material, if possible to do so without hazard. Warn occupants and downwind areas of fire and explosion hazard and request all to stay clear. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, advise authorities.

GENERAL PROCEDURES: Contain spilled liquid with sand or earth. Recover by pumping or with suitable absorbent.

7. HANDLING AND STORAGE

GENERAL PROCEDURES:

Do NOT pressurize, cut, heat, or weld containers. Empty product containers may contain product residue. Do NOT reuse empty containers without commercial cleaning or reconditioning.

STORAGE TEMPERATURE:

Keep from freezing

STORAGE PRESSURE:

Atmospheric

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES:

ENGINEERING CONTROLS: Ventilation should be provided to control worker exposures and prevent health risk; and as necessary to reduce, prevent and control aerosol generation.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Chemical goggles and face shield required.

SKIN: Where contact may occur, wear chemical resistant gloves, chemical jacket/apron and rubber boots.

RESPIRATORY: Where overexposure by inhalation may occur and engineering, work practice or other means of exposure reduction are not adequate, approved respirators may be necessary.

OTHER USE PRECAUTIONS: Safety shower and eyewash station are necessary in area of use.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
ODOR: Faint sweet
COLOR: Clear amber
pH: <2
PERCENT VOLATILE: 40
BOILING POINT: 40
FREEZING POINT: □ 50°F
SOLUBILITY IN WATER: Soluble Soluble
SPECIFIC GRAVITY: 1.39 to 1.41 at 77°F

10. STABILITY AND REACTIVITY

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

HAZARDOUS DECOMPOSITION PRODUCTS: Phosphines, Carbon Monoxide and Dioxide, oxides of Nitrogen

INCOMPATIBLE MATERIALS:

Avoid contact with strong alkalis; will result in violent reactions with the evolution of heat. Avoid contact with metal salts of sulfides and sulfites which could release toxic gases. Also avoid contact with strong oxidizing agents.

MATERIAL SAFETY DATA SHEET

11. TOXICOLOGICAL INFORMATION

COMMENTS: No information available.

12. ECOLOGICAL INFORMATION

COMMENTS: No information available.

13. DISPOSAL CONSIDERATIONS

EMPTY CONTAINER:

"Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.

RCRA/EPA WASTE INFORMATION:

Product, as sold, should be tested prior to disposal, as it may be a RCRA Characteristic Hazardous Waste if it meets the definition/characteristic of corrosivity (designated as D002).

GENERAL COMMENTS:

Ensure compliance with local, state, and Federal regulations in disposing of this container, residual contents, or rinsing.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)
PROPER SHIPPING NAME: Corrosive liquid, acidic, organic N.O.S.
TECHNICAL NAME: (PHOSPHONIC ACID, HYDROCHLORIC ACID)
PRIMARY HAZARD CLASS/DIVISION: 8
UN/NA NUMBER: UN 3265
PACKING GROUP: II
LABEL: CORROSIVE
NAERG: 15

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

311/312 HAZARD CATEGORIES: Acute Health.

FIRE: NO PRESSURE GENERATING: No REACTIVITY: No ACUTE: Yes CHRONIC: No

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA REGULATORY: If the reportable quantity of this product is accidentally spilled, the incident is subject to the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and must be reported to the National Response Center by calling 800-424-8802.

CERCLA RQ: 50,000 LBS

EPA

EPA RQ INGREDIENT: Hydrochloric acid (CAS # 7647-01-0)

TSCA (TOXIC SUBSTANCE CONTROL ACT)

MATERIAL SAFETY DATA SHEET

DATE PREPARED:09/18/2009
MAYOQUEST 1860

TSCA STATUS: This product is listed on the TSCA Inventory.

RCRA STATUS: Product, as sold, should be tested prior to disposal, as it may be a RCRA Characteristic Hazardous Waste if it meets the definition/characteristic of corrosivity (designated as D002).

16. OTHER INFORMATION

PREPARED BY: EH&S

HMIS RATING

HEALTH:	3
FLAMMABILITY:	0
REACTIVITY:	1
PERSONAL PROTECTION:	F

HMIS RATINGS NOTES: This information is for people trained in the National Paint & Coatings Association's (NPCA) Hazardous Materials Identification System (HMIS).

Key

4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

MANUFACTURER DISCLAIMER: NOTICE: We believe that the information contained on this Material Safety Data Sheet is accurate. The suggested procedures are based on experience as of the date of publication. They are not necessarily either all-inclusive or fully adequate in every circumstance. Also, these suggestions should not be confused with or followed in violation of applicable laws, regulation, rules or insurance requirements.

NO WARRANTY IS MADE, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.

Methanol

Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)

Date of issue: 09/22/2005 Revision date: 03/30/2017 Supersedes: 06/27/2016 Version: 5.2

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form	:	Substance
Trade name	:	Methanol
Chemical name	:	methanol
CAS No	:	67-56-1
Formula	:	CH_3OH

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Solvent, Fuel, Feedstock

1.3. Details of the supplier of the safety data sheet

Methanex Methanol Company
5850 Granite Parkway Suite 400
Plano, TX 75024 - USA
T +1 972 702 0909 - F +1 972 233 1266

Methanex Corporation
1800 Waterfront Centre,
200 Burrard Street, V6C 3M1 - Canada
T (604).661.2600

1.4. Emergency telephone number

Emergency number	:	CHEMTREC Emergency Tel. #: 1-800-424-9300 (Canada and USA) CANUTEC Emergency Tel.# (613)-996-6666 (Canada) *666 (cellular)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification in accordance with the Hazardous Products (HPR) Regulations (SOR /2015-17).

Flammable Liquids - Category 2
Acute Toxicity - Oral - Category 3
Acute Toxicity - Dermal - Category 3
Acute Toxicity - Inhalation - Vapor - Category 3
Serious Eye Damage/Eye Irritation - Category 2A
Reproductive Toxicity - Category 1A
Specific Target Organ Toxicity - Single Exposure - Category 1 (optic nerve , central nervous system , retina)
Specific Target Organ Toxicity - Single Exposure – Category 3

2.2. Label elements

GHS Labeling Elements

Hazard pictograms :

GHS02 GHS06 GHS07 GHS08

Signal word : Danger

Hazard statements :
H225 - Highly flammable liquid and vapor.
H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled.
H319 - Causes serious eye irritation.
H360 - May damage fertility or the unborn child.
H370 - Causes damage to organs.
H336 - May cause drowsiness or dizziness.

Precautionary statements :
Prevention
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking.
P233 - Keep container tightly closed.
P240 - Ground/bond container and receiving equipment.
P241 - Use explosion-proof electrical, ventilating, lighting equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.

P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hands thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves, protective clothing, eye protection, face protection.

Response
P370+P378 - In case of fire: Use Water spray to extinguish.
P307+P311 - If exposed: Call a poison center/doctor.
P301+P310 - If swallowed: Immediately call a doctor.
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P330 - Rinse mouth.
P363 - Wash contaminated clothing before reuse.

Storage
P403+P233 + P235 - Store in a well-ventilated place. Keep container tightly closed. Keep cool.
P405 - Store locked up.

Disposal
P501 - Dispose of contents/container to licensed waste management site

2.3. Other hazards (HNOC)

Health Hazard Not Otherwise Classified – Category 1: If swallowed there is a risk of blindness.

2.4. Unknown acute toxicity

0% of the mixture consists of ingredient(s) of unknown acute toxicity. (Oral, Dermal, Inhalation)

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%
Methanol	(CAS No) 67-56-1	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). Call a POISON CENTER or doctor/physician. Methanol is toxic and flammable. Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment and remove any sources of ignition).

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, give oxygen. Obtain medical attention.

First-aid measures after skin contact : Rinse skin with water/shower. Remove/Take off immediately all contaminated clothing. Immediately call a poison center or doctor/physician. Wash contaminated clothing before reuse.

First-aid measures after eye contact : Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Remove contact lenses, if present and easy to do. Continue rinsing. Ensure that folded skin of eyelids is thoroughly washed with water. Obtain medical attention if pain, blinking or redness persist.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention. Never give anything by mouth to an unconscious person.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Symptoms may include dizziness, headache, nausea and loss of coordination. CNS depression. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.

Symptoms/injuries after skin contact : Repeated exposure to this material can result in absorption through skin causing significant health hazard. Repeated and/or prolonged skin contact may cause irritation.

Symptoms/injuries after eye contact : Causes serious eye damage.

Symptoms/injuries after ingestion	:	Ingestion of as little as 10 ml of methanol can cause blindness and 30 ml (1 ounce) can cause death if victim is not treated. Ingestion causes mild central nervous system (CNS) depression with nausea, headache, vomiting, dizziness, incoordination and an appearance of drunkenness. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.
Chronic symptoms	:	Some teratogenic and fetotoxic effects, were observed in animal studies but are inconclusive.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically. The severity of outcome following methanol ingestion may be more related to the time between ingestion and treatment, rather than the amount ingested. Therefore, there is a need for rapid treatment of any ingestion exposure. Antidote is fomepizole which enhances elimination of metabolic formic acid. This must be administered by a trained medical professional only. For specialist advice physicians should contact the Poison Control Centre.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	:	Synthetic Fire fighting foam AR-FFF (3% solution). Dry powder. Carbon dioxide. Water spray. Sand.
Unsuitable extinguishing media	:	Do not use a heavy water stream. Water may be effective for cooling, diluting, or dispersing methanol, but may not be effective for extinguishing a fire because it will not cool methanol below its flash point. If water is used for cooling, the solution will spread if not contained. Mixtures of methanol and water at concentrations greater than 20% methanol are still considered flammable.

5.2. Special hazards arising from the substance or mixture

Fire hazard	:	Highly flammable liquid and vapor. Can accumulate in confined spaces, resulting in a toxicity and flammability hazard. Incomplete combustion releases dangerous carbon monoxide, carbon dioxide and other toxic gases. Under fire conditions closed containers may rupture or explode. Flame may be invisible during the day. The use of infrared and or heat detection devices is recommended.
Explosion hazard	:	May form flammable/explosive vapor-air mixture.
Reactivity	:	Stable under normal conditions.

5.3. Advice for firefighters

Firefighting instructions	:	Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.
Protection during firefighting	:	Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	:	Remove ignition sources. Use special care to avoid static electric charges. No open flames. No smoking.

6.1.1. For non-emergency personnel

Protective equipment	:	Wear suitable protective clothing, gloves and eye or face protection.
Emergency procedures	:	Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment	:	Wear suitable protective clothing and eye or face protection.
Emergency procedures	:	Remove ignition sources. Ensure adequate ventilation. Avoid inhalation of vapors. Avoid contact with eyes, skin and clothing.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Methanol's main physical behavior if spilled to water is described as "dissolves/evaporates" in the European Behaviour Classification system for chemicals (reported in IMO (2011)). GESAMP hazard profile: methanol does not bioaccumulate and is readily biodegradeable in the aquatic environment (IMO2011). Methanol is fully miscible in water and cannot be recovered.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Stop leak if safe to do so. Remove all sources of ignition. Small quantities of liquid spill: take up in non-combustible absorbent material and shovel into container for disposal. Use a non-sparking shovel. Wash spill area with soapy water. Large spills: Dike to collect large liquid spills. Alcohol resistant foams may be applied to spill to diminish vapour and fire hazard. Remove liquid by intrinsically safe pumps or vacuum equipment designed for vacuuming flammable materials (i.e. equipped with inert gases and ignition sources controlled). Place in suitable, covered, labelled containers.

6.4. Reference to other sections

SECTION 8: Exposure controls/personal protection. SECTION 13: Disposal considerations.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Handle empty containers with care because residual vapors are flammable.

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. No open flames. No smoking. Use only explosion-proof equipment. Use only non-sparking tools. Do not breathe Vapors.

Hygiene measures : Do not eat, drink or smoke when using this product. Wash hands and forearms thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical equipment. Have appropriate fire extinguishers and spill cleanup equipment in or near storage area.

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Ignition sources, Oxidising agents. Keep in fireproof place. Keep container tightly closed. Do not store in confined spaces.

Storage area : Store at room temperature. Keep out of direct sunlight. Store in a dry area. Keep container in a well-ventilated place. Fireproof storeroom. Keep locked up. Provide the tank with earthing. Unauthorized persons are not admitted.

Packaging materials : SUITABLE MATERIAL: Steel. Stainless steel. Iron. Glass. MATERIAL TO AVOID: Lead. Aluminum. zinc. Polyethylene. PVC.

7.3. Specific end use(s)

Solvent, Fuel, Feedstock.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Methanol (67-56-1)	
ACGIH :	200 ppm TWA 250 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route
NIOSH :	200 ppm TWA; 260 mg/m3 TWA 250 ppm STEL; 325 mg/m3 STEL Potential for dermal absorption 6000 ppm IDLH
OSHA (US) :	200 ppm TWA; 260 mg/m3 TWA
Alberta :	200 ppm TWA; 262 mg/m3 TWA 250 ppm STEL; 328 mg/m3 STEL Substance may be readily absorbed through intact skin
British Columbia :	200 ppm TWA Skin notation 250 ppm STEL
Manitoba:	200 ppm TWA Skin - potential for cutaneous absorption Skin - potential significant contribution to overall exposure by the cutaneous route
New Brunswick:	200 ppm TWA; 262 mg/m3 TWA 250 ppm STEL; 328 mg/m3 STEL Skin - potential for cutaneous absorption
Northwest Territories:	200 ppm TWA Skin notation 250 ppm STEL

Methanol (67-56-1)	
Nova Scotia:	200 ppm TWA 250 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route
Nunavut:	200 ppm TWA Skin notation 250 ppm STEL
Ontario:	200 ppm TWA 250 ppm STEL Danger of cutaneous absorption
Prince Edward Island:	200 ppm TWA 250 ppm STEL
Quebec:	200 ppm TWAEV; 262 mg/m3 TWAEV 250 ppm STEV; 328 mg/m3 STEV Skin designation
Saskatchewan:	200 ppm TWA 250 ppm STEL Potentially harmful after absorption through skin or mucous membranes
Yukon:	200 ppm TWA; 260 mg/m3 TWA 250 ppm STEL; 310 mg/m3 STEL Skin notation

8.2. Exposure controls

Appropriate engineering controls : Carry out operations in the open/under local exhaust/ventilation or with respiratory protection. Both local exhaust and good general room ventilation must be provided not only to control exposure but also to prevent formation of flammable mixtures. Emergency safety showers should be available in the immediate vicinity of any potential exposure. Use only explosion-proof equipment.

Personal protective equipment : Avoid all unnecessary exposure.

Hand protection : Wear natural rubber, neoprene, butyl rubber gloves. Disposal gloves must be replaced after each use.

Eye protection : Chemical goggles or safety glasses. Face-shield.

Skin and body protection : Wear chemical resistant overall.

Respiratory protection : Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. Wear a positive pressure full face self-contained breathing apprartus or a full face supplied air respirator.

Other information : Smoking, eating and drinking should be prohibited in areas of storage and use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Appearance : Clear.

Molecular mass : 32.04 g/mol

Color : Colorless.

Odor : alcohol odor.

Odor threshold : 4.2 - 5960 ppm

pH : Not applicable

Relative evaporation rate (butyl acetate=1) : 4.1

Melting point : -97.8 °C

Freezing point : -97.6 °C

Boiling point : 64.7 °C

Flash point : 11 °C

Auto-ignition temperature : 464 °C

Decomposition temperature : Not available

Flammability (solid, gas) : No data available

Vapor pressure : 12.8 kPa @ 20°C

Relative vapor density at 20 °C : 1.1

Relative density : 0.791 - 0.793 @ 20°C

Relative density of saturated gas/air mixture	:	1.0
Specific gravity / density	:	792 kg/m³
Solubility	:	Miscible with water.
Partition coefficient: n-octanol/water	:	-0.77 (log value)
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	0.8 cP (25 °C)
Explosive properties	:	vapors may form explosive mixture with air.
Oxidizing properties	:	Not oxidizing.
Explosive limits	:	5.5 - 36.5 vol %

9.2. Other information

VOC content : 100 %

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions.

10.2. Chemical stability

The product is stable under storage at normal ambient temperatures. Highly flammable liquid and vapor. May form flammable/explosive vapor-air mixture. Hygroscopic.

10.3. Possibility of hazardous reactions

Under fire conditions closed containers may rupture or explode.

10.4. Conditions to avoid

Direct sunlight. High temperature. Open flame. Ignition sources.

10.5. Incompatible materials

Oxidizing agents. Strong acids. Strong bases. Methanol is not compatible with gasket and O-rings materials made of Buna-N and Nitrile.

10.6. Hazardous decomposition products

Heat. Carbon monoxide. Carbon dioxide. Releases flammable gases. Formaldehyde.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on Likely Routes of Exposure

Inhalation	:	Symptoms may include dizziness, headache, nausea and loss of coordination. CNS depression. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.
Skin Contact	:	Repeated exposure to this material can result in absorption through skin causing significant health hazard. Repeated and/or prolonged skin contact may cause irritation.
Eye Contact	:	Causes serious eye damage.
Ingestion	:	Ingestion of as little as 10 ml of methanol can cause blindness and 30 ml (1 ounce) can cause death if victim is not treated. Ingestion causes mild central nervous system (CNS) depression with nausea, headache, vomiting, dizziness, incoordination and an appearance of drunkenness. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.
Acute toxicity	:	Toxic if swallowed. Toxic in contact with skin. Toxic if inhaled.

Methanol (67-56-1)	
LD50 oral rat	5600 mg/kg
LD50 dermal rabbit	15800 mg/kg
LC50 inhalation rat (ppm)	64000 ppm/4h rat

Immediate Effects	:	Poison. If swallowed there is a risk of blindness. Toxic if swallowed, in contact with skin or if inhaled. Causes serious eye irritation. May cause drowsiness or dizziness. Causes damage to organs: optic nerve, central nervous system, retina.
Delayed Effects	:	May damage fertility or the unborn child.
Skin corrosion/irritation	:	Not classified Based on available data, the classification criteria are not met pH: Not applicable
Serious eye damage/irritation	:	Causes serious eye irritation. pH: Not applicable
Respiratory or skin sensitization	:	Not classified Based on available data, the classification criteria are not met
Germ cell mutagenicity	:	Not classified Based on available data, the classification criteria are not met
Carcinogenicity	:	Not classified None of this product's components are listed by ACGIH, IARC, NTP, DFG or OSHA
Reproductive toxicity	:	May damage fertility or the unborn child.
Specific target organ toxicity (single exposure)	:	Causes damage to organs: optic nerve, central nervous system, retina. May cause drowsiness or dizziness.
Specific target organ toxicity (repeated exposure)	:	Not classified Based on available data, the classification criteria are not met
Aspiration hazard	:	Not classified Based on available data, the classification criteria are not met

SECTION 12: Ecological information

12.1. Toxicity

Methanol (67-56-1)	
LC50 fish	15400 - 29400 mg/l 96 h - Fish
EC50 Daphnia	> 10000 mg/l 48 h - Daphnia
EC50 other aquatic organisms 1	22000 mg/l 72h - Selenastrum carpricornutum (Pseudokichnerela subcapitata)

12.2. Persistence and degradability

Methanol (67-56-1)	
Persistence and degradability	Rapidly degradable.

12.3. Bioaccumulative potential

Methanol (67-56-1)	
BCF fish 1	< 10 (Leuciscus idus)
Log Pow	0.82
Bioaccumulative potential	Bioaccumulation unlikely. Based on the n-octanol/water partition coefficient accumulation in organisms is not expected.

12.4. Mobility in soil

Methanol (67-56-1)	
Mobility in soil	Mobile

12.5. Other adverse effects

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Methanol waste should be handled and stored in a similar manner to methanol products or mixtures. Avoid release to the environment. Collect methanol waste in secure and sealable containers. Refer to section 6 and 7 for information on accidental releases, handling and storage conditions. Methanol waste shall not be mixed together with other waste. Dispose methanol waste in a safe manner in accordance with local and/or national regulations. Use qualified hazardous waste companies to transport and dispose of methanol waste. Recycle wherever possible. Large volumes may be suitable for re-distillation. Empty containers may contain hazardous residue. Never weld, cut or grind empty containers. Empty containers should be thoroughly rinsed with large quantities of clean water. Rinse water should be disposed of as methanol waste.

SECTION 14: Transport information

In accordance with DOT/TDG

Transport document description	:	UN1230 Methanol, 3, II
UN-No.	:	1230
DOT NA no.	:	UN1230
Proper Shipping Name	:	Methanol
Transport hazard class(es)	:	3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120
Hazard labels	:	3 - Flammable liquid 6.1 - Poison inhalation hazard

Packing group	:	II - Medium Danger
DOT Packaging Exceptions (49 CFR 173.xxx)	:	150
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	202
DOT Packaging Bulk (49 CFR 173.xxx)	:	242
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	1 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	60 L
Marine pollutant	:	No

Transport by sea

UN-No. (IMDG)	:	1230
Proper Shipping Name (IMDG)	:	METHANOL
Class (IMDG)	:	3 - Flammable liquids
Packing group (IMDG)	:	II - substances presenting medium danger
Subsidiary risks (IMDG)	:	6.1

Air transport

UN-No. (IATA)	:	1230
Proper Shipping Name (IATA)	:	METHANOL
Class (IATA)	:	3 - Flammable Liquids
Packing group (IATA)	:	II - Medium Danger
Subsidiary risks (IATA)	:	6.1

SECTION 15: Regulatory information

15.1. US Federal Regulations

Methanol (67-56-1)	
This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.	
SARA 313:	1 % de minimis concentration
CERCLA:	5000 lb final RQ ; 2270 kg final RQ
SARA Section 311/312 Hazard Classes (40 CFR 370 Subparts B and C) 2016 reporting categories:	**Acute Health:** Yes **Chronic Health:** Yes **Fire:** Yes **Pressure:** No **Reactivity:** No
SARA Section 311/312 (40 CFR 370 Subparts B and C) 2017 reporting categories:	Flammable; Acute toxicity; Reproductive Toxicity; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity

15.2. Canada Federal Regulations

Methanol (67-56-1)	
CEPA - Priority Substances List:	None of this product's components are on the list.
Ozone Depleting Substances:	None of this product's components are on the list.
Council of Ministers of the Environment - Soil Quality Guidelines:	None of this product's components are on the list.

Methanol (67-56-1)	
Council of Ministers of the Environment - Water Quality Guidelines:	None of this product's components are on the list.

15.3. Component Analysis - Inventory

Methanol (67-56-1)													
US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

15.4. US State Regulations

Methanol (67-56-1)	
U.S. - California - Proposition 65 - Developmental Toxicity	Yes
State or local regulations	U.S. - California - Hazardous Substance List U.S. - Massachusetts - Right To Know List U.S. - Minnesota - Hazardous Substance List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Summary of Changes : Updated: 03/30/2017

Other information

Key / Legend : ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CFR - Code of Federal Regulations (US); CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC – European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; NDSL – Non-Domestic Substance List (Canada); NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL-Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); WHMIS - Workplace Hazardous Materials Information System (Canada).

NFPA health hazard : 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard : 3 - Liquids and solids that can be ignited under almost all ambient conditions.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

HMIS VI Rating

Health	:	4 Severe Hazard - Life-threatening, major or permanent damage may result from single or repeated overexposures * Chronic Hazard - Chronic (long-term) health effects may result from repeated overexposure
Flammability	:	3 Serious Hazard
Physical	:	0 Minimal Hazard

The information above is believed to be accurate and represents the best information currently available to us. Users should make their own investigations to determine the suitability of the information for their particular purposes. This document is intended as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.
Methanex Corporation and its subsidiaries make no representations or warranties, either express or implied, including without limitation any warranties of merchantability, fitness for a particular purpose with respect to the information set forth herein or the product to which the information refers. Accordingly, Methanex Corp. will not be responsible for damages resulting from use of or reliance upon this information.

Material Safety Data Sheet

Morton *International*
110 North Wacker Drive, Chicago, IL 60606-1553

Emergency Phone No. (312) 807-2000

PRODUCT IDENTIFICATION

Chemical Name: Sodium Chloride
Common Name: Salt
Product Name: COARSE SOLAR SALT
CAS Number: 7647-14-5
Chemical Formula: NaCl
Product Use:

HAZARDOUS INGREDIENTS

Chemical Name	Common Name	CAS NO.	%	OSHA PEL	ACGIH TLV-TWA
None					

PHYSICAL DATA

Boiling Point, (760mm Hg.) 1413°C
Specific Gravity (Water = 1) 2.165
Vapor Pressure (mm Hg) 1mm @ 865°C
% Non-Volatile 100
Vapor Density (AIR = 1) N/A
Evaporation Rate (Ether = 1) N/A
Solubility in Water 1g in 2.8ml H_2O at 25°C
pH 6.7 - 7.3
Appearance White Crystalline Powder
Odor Odorless

FIRE AND EXPLOSION HAZARD DATA

Flash Point N/A °F
Flammable Limits Lel N/A Uel N/A
Method Used: Non-Combustible

Extinguishing Media: Not applicable

Special Fire Fighting Procedures: Not applicable

Unusual Fire and Explosion Hazards: Not applicable

Hazardous Decomposition Products: When heated to decomposition it emits toxic fumes of Cl_2 and Na_2O

HEALTH HAZARD DATA

Oral Toxicity:

Does not meet toxicity criteria under OSHA 1910.1200 Hazard Communication, Appendix A parts 3. & 6.

Dermal Toxicity:

Not toxic to the skin

Eye:

Not toxic to the eye

Inhalation:

Not toxic through inhalation

Chronic Toxicity: No applicable information found

Mutagenesis: No applicable information found

Effects of Overexposure:

Ingestion:
1. Disagreeable taste
2. Nausea and vomiting

Skin Contact:
1. Irritation
2. Inflammation
3. Small ulcerations

Eye Contact:
1. Mechanical irritation
2. Watering of eyes
3. Inflammation of conjunctivas

Inhalation:
1. Slight irritation of nose
2. Sneezing

Acute Systemic Effects:

Ingestion of large amounts can cause irritation of the stomach

Chronic Systemic Effects:

No applicable information found.

EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:
1. Wash the affected eye or eyes under slowly running water for 15 minutes or longer making sure that the victim's eyelids are held wide apart and he moves his eyes slowly in every direction.
2. Make sure that no solid particles remain the the creases of the eye; if they do, continue to wash the eye.
3. If the pain persists, the medical service will refer the victim to an ophthalmologist.

Skin Contact:
1. Remove the victim from the source of contamination.
2. Remove clothing from the affected area.
3. Wash affected area under the shower.
4. Rinse carefully.

Skin Contact: (continued)
5. Dry gently with a clean soft towel.
6. If the skin is inflamed or painful, contact the medical service who will treat it in the same way as a heat or thermal burn.

Inhalation:
1. Make the victim blow his nose to remove the dust but discourage him from sniffing.
2. If there is any doubt about the victim's condition send or escort him to the infirmary, first-aid room or hospital.

Ingestion:
1. Make the victim vomit by having him stick his finger down his throat or tickling his uvula with the handle of a spoon.
2. Afterwards give him as much milk or water as he wants.

REACTIVITY DATA

Stability ☒ Stable ☐ Unstable **Conditions to Avoid:**

Incompatibility: (Materials to Avoid)
Bromine Trifluoride, Lithium (BrF_3, Li)

Can Hazardous Polymerization Occur: No

Hazardous Decomposition Products and Conditions:
When heated to decomposition it emits toxic fumes of Cl_2 and Na_2O

SPILL OR LEAK PROCEDURES

Response to Small Spills: No special requirements

Response to Large Spills: No special requirements

Hazards to be Avoided: None known

Reportable Quantity: Check your State for requirements

Waste Classification: Some States have set maximum limits on Chlorides in waste effluent.

Disposal Methods: Dilution with water is the only practical method to meet requirements.

SPECIAL PROTECTION INFORMATION

Respiratory Protection: No special equipment

For Hands, Body: No special equipment

For Eyes: No special equipment

Ventilation: None required

SPECIAL PRECAUTIONS

Other Precautions:

Transport in dry equipment. Storage should be in a dry location.

LABELING INFORMATION

DOT Shipping Name: Salt (common) sodium chloride
DOT Label: Not applicable
UN No.: Not applicable

Other Contents of Product Label:

Not applicable

WARNING:

None

USERS RESPONSIBILITY

The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment.

Disclaimer of Liability

The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations.

Nothing contained herein is to be construed as a recommendation for use in violation of any patents or of applicable laws or regulations.

Morton International
110 North Wacker Drive, Chicago, IL 60606-1555 (312) 807-2000

NEW CHEMICAL PURCHASING REQUEST Date: 12-23-97 No.: 055-97

Requestor: Chris Herman Requestor's Team: Boiler

2. Chemical Substance: Sodium Chloride (SALT) CAS No.: 7647-14-5

Manufacturer/Supplier: MORTON INTERNATIONAL - AGWAY Is MSDS Complete: yes ☑ no ☐

Chemical is a: solid ☑, liquid ☐, gas ☐, paste/gel/semi-solid ☐

Type and Size of Shipping Container (i.e. 55 gal. drum, 5 gal. pail): 50 lb bags

Where will Chemical be Stored: B warehouse 118

3. Proposed Chemical Use: water softener system regeneration boiler blr

Frequency of Use: single use ☐, daily ☐, weekly ☑, monthly ☐, yearly ☐, other (describe) ☐:

Quantity to be Used (i.e., 5 gal/day, 10 lbs/week, etc.): 250 lbs/week added to boiler

Duration of Each Use (i.e., 1 hour/day):

4. Waste Disposal: hazardous ☐, non-hazardous ☐, used oil ☐, WWTP ☑, no waste ☐

5. Hazardous Chemical Ingredients (see MSDS):

NONE

Expected Workplace Exposure Levels: below threshold ☐, above threshold ☐, N/A ☑

Health Hazards (see MSDS): INGESTION OF LARGE AMOUNTS CAN CAUSE IRRITATION OF THE STOMACH

6. Engineering Controls (enclosures, ventilation systems, etc.):

N/A

7. Personal Protective Equipment Required:

Protective Clothing ☐: N/A

Eye and Face Protection ☐: N/A

Repiratory Protection ☐: N/A

8. Required Medical Surveillance:

Pulmonary Tests ☐: N/A

Urine Analysis ☐: N/A

Blood Analysis ☐: N/A

9. Routine Monitoring Requirements: workplace exposure levels ☐, medical surveillance ☐ N/A

10. Training Requirements: NONE

11. Purchasing Request Approval: Date: 12-23-97

12 Environmental Health & Safety Coordinator: Date: 12/23/97

SAFETY DATA SHEET
MYKON HD

Print Date: 31-Oct-2016 **Revision Date** 31-Oct-2016 **Version** 6.01

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier
Product Name **MYKON HD**

Other means of identification
Synonyms None

Recommended use of the chemical and restrictions on use
Recommended Use Industrial.
Uses advised against No information available

Details of the supplier of the safety data sheet
Supplier Address
OMNOVA Solutions Inc.
25435 Harvard Road
Beachwood, OH 44122-6201
Telephone: +1 216-682-7000

E-mail address
SDS@OMNOVA.com

Emergency telephone number
Emergency Telephone Chemtrec 1-800-424-9300 Chemtrec international: +1 703 527 3887

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).***

Label elements

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health***

Appearance milky white **Physical state** liquid **Odor** mild

Hazards not otherwise classified (HNOC)
Not Applicable

Unknown Acute Toxicity 0% of the substance or mixture consists of ingredient(s) of unknown toxicity***

3. COMPOSITION/INFORMATION ON INGREDIENTS

The product contains no substances which at their given concentration, are considered to be hazardous to health.***

.***

4. FIRST AID MEASURES

First aid measures

Eye contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. If symptoms persist, call a physician.***

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. If skin irritation persists, call a physician.***

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. If symptoms persist, call a physician.***

Ingestion Rinse mouth. Drink plenty of water. If symptoms persist, call a physician. Do NOT induce vomiting.***

Self-protection of the first aider Use personal protective equipment as required.***

Most important symptoms and effects, both acute and delayed

Symptoms No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.***

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Dry chemical, CO2 or water spray.

Unsuitable extinguishing media Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

No information available.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Use personal protective equipment as required. Avoid contact with eyes and skin. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.***

Environmental precautions

Environmental precautions Do not allow into any sewer, on the ground or into any body of water. Dike to collect large liquid spills. See Section 12 for additional ecological information.***

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.***

Methods for cleaning up Use personal protective equipment as required. Dam up. Cover liquid spill with sand, earth or other non-combustible absorbent material. Take up mechanically, placing in appropriate containers for disposal. Clean contaminated surface thoroughly. Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.***

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Ensure adequate ventilation, especially in confined areas. In case of insufficient ventilation, wear suitable respiratory equipment.***

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep in properly labeled containers. Keep container tightly closed in a dry and well-ventilated place. Keep from freezing.***

Incompatible materials None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .***

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).***

Skin and body protection Wear protective gloves and protective clothing.

Respiratory protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.***

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	liquid	**Odor threshold**	No information available
Appearance	milky white	**Odor**	mild
Color	white		

Property	**Values**	**Remarks • Method**
pH	9	***
Melting point/freezing point	0*** °C*** /*** 32*** °F***	***
Boiling point / boiling range	100 ° C*** /*** 212 ° F***	***

Flash point	>*** 100 ° C*** /*** 212 ° F***	***
Evaporation rate		No information available
Flammability (solid, gas)		No information available
Flammability Limit in Air		
Upper flammability limit:		No information available
Lower flammability limit:		No information available
Vapor pressure		No information available
Vapor density		No information available
Water solubility	Miscible in water	***
Solubility in other solvents		No information available
Partition coefficient		No information available
Autoignition temperature		No information available
Decomposition temperature		No information available
Kinematic viscosity		No information available
Dynamic viscosity		No information available
Explosive properties		No information available
Oxidizing properties		No information available

Other Information

Explosion severity	
Danger of Explosion, cloud	No information available
Minimum Ignition Energy, Cloud, mJ	No information available
KST, (cloud), bar.m.s-1	No information available
Pmax maximum explosion pressure, Cloud, bar	No information available
VMP, (cloud), bar.s-1	No information available
LOC Limiting Oxygen Concentration, Cloud, %v/v O2	No information available
Softening point	No information available
Molecular weight	No information available
Density	No information available
Bulk density	No information available
Specific Gravity	1.0 ***
Granulometry	No information available
Moisture content	No information available

10. STABILITY AND REACTIVITY

Reactivity
No data available

Chemical stability
Stable under recommended storage conditions.

Possibility of Hazardous Reactions
None under normal processing.

Conditions to avoid
Extremes of temperature and direct sunlight.

Incompatible materials
None known based on information supplied.

Hazardous Decomposition Products
Carbon monoxide. Carbon dioxide (CO2). Hydrocarbons.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information	No data available
Inhalation	No data available.
Eye contact	No data available.
Skin Contact	No data available.
Ingestion	No data available.

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization	No information or data specific to the product on this toxicological (health) effect is available
Germ cell mutagenicity	No information or data specific to the product on this toxicological (health) effect is available.
Carcinogenicity	No information or data specific to the product on this toxicological (health) effect is available.***
Reproductive toxicity	No information or data specific to the product on this toxicological (health) effect is available.
STOT - single exposure	No information or data specific to the product on this toxicological (health) effect is available.
STOT - repeated exposure	No information or data specific to the product on this toxicological (health) effect is available.
Chronic toxicity	No information or data specific to the product on this toxicological (health) effect is available.***
Aspiration hazard	No information or data specific to the product on this toxicological (health) effect is available.

Numerical measures of toxicity - Product Information

12. ECOLOGICAL INFORMATION

Ecotoxicity

Persistence and degradability
No information available.

Bioaccumulation
No information available.

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging Do not reuse container.

14. TRANSPORT INFORMATION

DOT **Not regulated**

IATA Not regulated

IMDG Not regulated

15. REGULATORY INFORMATION

International Inventories

AICS	No
DSL	Yes
NDSL	No
IECSC	Yes
EINECS	Yes
ELINCS	No
ENCS	Yes
KECL	Yes
PICCS	No
TSCA	Yes
NZIoC	Yes

Legend:

AICS - Australian Inventory of Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
IECSC - China Inventory of Existing Chemical Substances
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372***

SARA 311/312 Hazard Categories

Acute health hazard	No
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)***

16. OTHER INFORMATION

NFPA	**Health hazards** 1***	**Flammability** 1***	**Instability** 0	**Physical and Chemical Properties** -
HMIS	**Health hazards** 1***	**Flammability** 1***	**Physical hazards** 0	**Personal protection** X

Revision Date 31-Oct-2016
Revision Note
SDS sections updated (***)

Disclaimer

The information provided above is intended as a guide to assist in the safe handling, use, processing, storage, transportation, disposal and release of the material listed. Nothing contained herein is to be considered as an express or implied warranty of performance or quality. The information relates only to the specific material designated and may not be applicable when such material is used in combination with any other materials or as part of any process, except as otherwise expressly described herein. The information is believed to be true and correct as of the date issued. Always make sure you are using the most current information available. The material described herein is produced for commercial and industrial use only and unless otherwise specifically designated by the manufacturer in writing has not received any specific regulatory approval such as approvals for food contact or for use in medical/surgical applications or devices. It is buyer and user's sole and exclusive responsibility to ensure that any handling, use, processing, storage, transportation, disposal and release of the material complies with all applicable laws, rules and regulations.

End of Safety Data Sheet

SAFETY DATA SHEET

Issue Date 02-May-2016 **Revision Date** 02-May-2016 **Version** 2

SECTION 1: Identification of the mixture/mixture and of the company/undertaking

1.1. Product identifier

Safety data sheet number	920044
Product Name	Sulfuric Acid
Index number	016-020-00-8
Trade Name	Sulfuric Acid 77%-100%
EC No.	231-639-5
CAS No.	7664-93-9
Chemical Name	Sulfuric acid
Synonyms	Dihydrogen Sulfate; Oil of vitriol; Vitriol Brown Oil; Acide sulfurique; 60 Deg Technical; 66 Deg Technical; 93% Technical; 1.835 Electrolyte; 98 % Technical; 99 % Technical; 100 % Technical.
Formula	H_2SO_4
Molecular weight	98.08 g/mol

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use	Chemical industries. Water treatment chemical. Manufacture of pulp, paper and paper products. Fertilizer.
Uses advised against	Not available.

1.3. Details of the supplier of the safety data sheet

Manufacturer

- NorFalco LLC, Three Stamford Plaza, 301 Tresser Boulevard, Stamford, Connecticut, 06901-3244 USA.
- NorFalco Sales, a division of Glencore Canada Corporation, 100 King W., Toronto, ON, Canada, M5X 1E3.
- Noranda Income Limited Partnership (CEZinc), Salaberry-de-Valleyfield (Quebec)Canada J6T 6L4.
- Horne Smelter-A Glencore company, Rouyn-Noranda (Quebec) J9X 5B6.
- Brunswick Smelting-A Glencore company, Belledune, New Brunswick E0B 1 G0.
- Sudbury integrated Nickel Operations-A Glencore company, Falconbridge, Ontario P0M 1SO.

Website	www.norfalco.com.
Contact Point	General Office : 1-416-775-1400
E-mail address	NorfalcoTechnicalService@glencore-ca.com

1.4. Emergency telephone number

Emergency Telephone	Medical emergency in Canada : 1-418-656-8090 Glencore 24/24 7/7 : 1-760-476-3962 (333261)

Transportation Emergency Telephone

Canada: 1-877-ERP-ACID (377-2243)
CANUTEC: 1-613-996-6666
1-888-CAN-UTEC (226-8832)
USA: 1-800-424-9300 CHEMTREC

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Regulation (EC) No 1272/2008
Full text of H- and EUH-phrases: see section 16

Skin corrosion/irritation	Category 1 H314

Classification according to Directive 67/548/EEC or 1999/45/EC
Full text of R-phrases: see section 16

Hazard symbols
C - Corrosive

R-code(s)
C;R35

2.2. Label elements

Product identifier

Hazard pictograms : Corrosive
Signal word : Danger
Contains : sulfuric acid
H314 - Causes severe skin burns and eye damage

Precautionary Statements - EU (§28, 1272/2008)

P260-Do not breathe dust fume/ gas/ mist vapors/ spray.
P264-Wash hands, face and skin thoroughly after handling. P280-Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331-IF SWALLOWED: rinse mouth. DO NOT induce vomiting.
P303+P361+P353-IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
P363-Wash contaminated clothing before reuse.
P304+P340-IFINHALED : Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P310-Immediately call a POISON CENTER or doctor/physician.
P321-Specific treatment (see on this label).
P305+P351+P338-IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501-Dispose of contents/container in full compliance with Federal, Provincial and local regulations.

2.3. Other hazards

Extremely corrosive. Harmful or fatal if swallowed. Harmful if inhaled. Severe eyes and skin irritation. Possibility of damage to the upper respiratory tract and lung tissues.

Environmental hazard: Strong acid. Highly toxic to plants and to aquatic organisms.
Not a PBT or vPvB substance or mixture.

Risk phrases :
R35-Causes severe burns
Safety phrase :
S1-Store locked up
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S30- Never add water to this product
S45- In case of accident or if you feel unwell, seek medical advice immediately {show the label where possible).

WHMIS classification (Canada)
CLASS D-1A: Very toxic material causing immediate and serious effects
CLASS E : Corrosive material

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical Name	EC No.	CAS No.	Weight-%	Classification GHS /CLP (Regulation (EC) No. 1272/2008)
Sulfuric acid	231-639-5	7664-93-9	77-100	Skin Corr. 1A (H314)

Additional information
All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are inpercent by volume.

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Inhalation If not breathing, give artificial respiration. Take precautions to avoid secondary contamination by residual acids. Difficult breathing : Give oxygen.

Skin contact Rinse skin with water/shower for 15 minutes (Pay particular attention to : Folds, crevices, creases, groin). While the patient is being transported to a medical facility, continue the application of cold, wet compresses.
Notes to physicians : If medical treatment must be delayed, repeat the flushing with tepid water or soak the affected area with tepid water to help remove the last traces of sulfuric acid. Creams or ointments SHOULD NOT be applied before or during the washing phase of the treatment. Call a physician if irritation persists. Wash contaminated clothing before reusing.

Eye contact Consult a physician. If medical treatment must be delayed, repeat the flushing with tepid water or soak the affected area with tepid water to help remove the last traces of sulfuric acid

Ingestion Do not induce vomiting. Conscious and alert person : Rinse mouth with water and give 1/2 to 1 cup of water or milk to dilute material. Spontaneous vomiting : Keep head below hips to prevent aspiration ; Rinse mouth and give 1/2 to 1 cup of water or milk. UNCONSCIOUS person : DO NOT induce vomiting or give any liquid. Immediately obtain medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms Corrosive to the eyes and may cause severe damage including blindness. Causes burns.

4.3. Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically. Symptoms may be delayed.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media
ERG (Emergency Response Guidebook) : Guide 137
When material is not involved in fire, do not use water on material itself.

Small Fire	Dry chemical or CO_2. Move containers from fire area if you can do it without risk.
Large Fire	Flood fire area with large quantities of water, while knocking down vapors with water fog. If insufficient water supply: knock down vapors only.

Fire involving Tanks or Car/Trailer Loads :
Cool containers with flooding quantities of water until well after fire is out. Do not get water inside containers. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire.

Unsuitable extinguishing media
No information available

5.2. Special hazards arising from the substance or mixture

Non-combustible.
Hazardous combustion products: Releases of sulfur dioxide at extremely high temperatures.
Fire hazard : Not flammable

Exlosion hazard : Reacts with most metals, especially when dilute : Hydrogen gas release (Extremely flammable, explosive). Risk of explosion if acid combined with water, organic materials or base solutions in enclosed spaces (Vaccum trucks, tanks). Mixing acids of different strengths/concentrations can also pose an explosive risk in an enclosed space/container.

5.3. Advice for firefighters

Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Move containers from fire area if you can do it without risk.
Evacuate personnel to a safe area. Keep personnel removed and upwind of fire. Generates heat upon addition of water, with possibility of spattering. Wear full protective clothing. Runoff from fire control may cause pollution. Neutralize run-off with lime, soda ash, etc., to prevent corrosion of metals and formation of hydrogen gas. Wear self-contained breathing apparatus if fumes or mists are present.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions
Ensure adequate ventilation, especially in confined areas. Ventilate affected area. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Wear protective gloves/protective clothing and eye/face protection.

For emergency responders
keep unnecessary personnel away. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Use personal protection recommended in Section 8.

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not contaminate water.

6.3. Methods and material for containment and cleaning up

Methods for containment Dike large spills, and cautiously dilute and neutralize with lime or soda ash, and transfer to waste water treatment system. Prevent liquid from entering sewers, waterways, or low areas. If this product is spilled and not recovered, or is recovered as a waste for treatment or disposal, the Reportable Quantity (U.S. DOT) is 1 000 lbs and 5 I or 5 kg (Section 8 TDG Canada) (Based on the sulfuric acid content of the solution spilled}. Comply with Federal, State, Provincial, and local regulations on reporting releases.

Methods for cleaning up Clean up in accordance with all applicable regulation.

6.4. Reference to other sections

Use personal protection recommended in Section 8. For waste disposal, see section 13.

SECTION 7: Handling and Storage

7.1. Precautions for safe handling

Advice on safe handling DO NOT get in eyes, on skin, or on clothing. Avoid breathing vapours or mist. Wear approved respirators if adequate ventilation cannot be provided. Wash thoroughly after handling. Ingestion or inhalation : Seek medical advice immediately and provide medical personnel with a copy of this SDS. NEVER add water to acid. Avoid aerosol formation.

General Hygiene Considerations Use personal protection recommended in Section 8. Wash hands thoroughly after handling. Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions Sulfuric acid must be stored in containers or tanks that have been specially designed for use with sulfuric acid. DO NOT add water or other products to contents in containers as violent reactions will result with resulting high heat, pressure and/or generation of hazardous acid mists.
P405-Store locked up. Keep containers away from heat, sparks, and flame. All closed containers must be safely vented before each opening. For more information on sulfuric acid tanks, truck tanks and tank cars including safe unloading information go to www.norfalco.com.

Packaging materials Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

7.3. Specific end use(s)

Specific use(s) For detailed information, see section 1.

Risk Management Methods (RMM) The information required is contained in this Material Safety Data Sheet.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Chemical Name	ACGIH (U.S.A.) TLV-TWA (mg/m^3)	OSHA (U.S.A.) PEL-TWA (mg/m^3)
Sulfuric acid 7664-93-9	0.2	1

Sulfuric acid : Exposure limits may be different in other jurisdictions.
NIOSH REL-TWA (≤10 hours) : 1 mg/m^3.
IDLH : 15 mg/m^3
Consult local authorities for acceptable exposure limits.

8.2. Exposure controls

Engineering Controls Good general ventilation should be provided to keep vapour and mist concentrations below the exposure limits.

Personal protective equipment

Chemical splash goggles ; Full-length face shield/chemical splash goggles combination ; Acid-proof gauntlet gloves, and boots ; Long sleeve wool, acrylic, or polyester clothing under an acid proof suit ; Appropriate NIOSH respiratory protection if acid mist is present.
An apron can be used in place of acid proof suit in laboratory environment, or in handling small volumes of sulfuric acid. A formal risk assessment should be performed before following this recommendation to ensure exposure is minimized.
In case of emergency or where there is a strong possibility of considerable exposure, wear a complete acid suit with hood, boots, and gloves. If acid vapour or mist are present and exposure limits may be exceeded, wear appropriate NIOSH respiratory protection.

Environmental exposure controls No information available.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	liquid		
Appearance	Oily, Clear to turbid	**Odor**	Odorless
Color	Colorless to light grey	**Odor threshold**	No data available

Property	Values	Remarks • Method
pH	< 1	No information available
Melting point / freezing point	-35 °C to 11 °C (-31°F to 52°F)	
Boiling point / boiling range	193 °C to 327 °C (379°F to 621°F) @ 760mm Hg	No information available
Flash point		No information available
Evaporation rate		No information available
Flammability (solid, gas)		No information available
Flammability Limit in Air		
Upper flammability limit:		No information available
Lower flammability limit:		No information available
Vapor pressure	<0.3 mmHg @ 25 °C (77 °F) < 0.6 mm hg @ 38 °C (100 °F)	
Vapor density		No information available
Water solubility		No information available
Solubility(ies)	Miscible	
Partition coefficient		No information available
Autoignition temperature		No information available
Decomposition temperature		No information available
Kinematic viscosity		No information available
Dynamic viscosity	22.5 cP at 20°C (68°F)	For Sulfuric acid 93 %
Explosive properties		Not explosive
Oxidizing properties		Not an oxidizer

9.2. Other information

Softening point		No information available
Molecular weight	98.08 g/mol	
Volatility	< 1 (Butyl acetate=1.0)	No information available
Bulk density		No information available

GRADE	Boiling point		Freezing point		Density
	DEG°C	DEG°F	DEG°C	DEG°F	
60 DEG TECHNICAL	193	380	-12	10	1.706
66 DEG or 93% TECHNICAL	279	535	-35	-31	1.835
1.835 ELECTROLYTE	279	535	-35	-31	1.835
98 % TECHNICAL	327	621	-2	29	1.844
99 % TECHNICAL	310	590	4	40	1.842
100 % TECHNICAL	274	526	11	51	1.839

SECTION 10: Stability and reactivity

10.1. Reactivity

Reacts violently with water, organic substances and base solutions with evolution of heat and hazardous mists.

10.2. Chemical stability

Stable under normal conditions, at ambient temperature.

10.3. Possibility of hazardous reactions

Possibility of Hazardous Reactions
Hazardous polymerization does not occur. Reacts violently with water.

10.4. Conditions to avoid

Heat, sources of ignition.

10.5. Incompatible materials

Vigorous reactions with : Water ; alkaline solutions ; Metals, metal powder ; Carbides ; Chlorates ; Fulminates; nitrates; Picrates ; Strong oxidizing, reducing, or combustible organic materials. Hazardous gases are evolved on contact with chemicals such as cyanides, sulfides, and carbides. Sulfuric acid reacts with metal to produce hydrogen, a flammable and potentially explosive gas. Hydrogen reacts with sulfides and generates hydrogen sulfide (Highly toxic gas). *NEVER add water directly to sulfuric acid because a violent exothermic reaction may occur.*

10.6. Hazardous decomposition products

Possibility of decomposition if heated and in contact with sources of ignition. Release of toxic gases and vapours (Sulfur oxides (SO_2 , SO_3)).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Route of entries: Ingestion. Inhalation. Skin and eye contacts.

Acute toxicity ORAL acute (LD50): 2 140 mg/kg (Rat). INHALATION acute (LC50, 2 hours): 510 mg/m^3 (Rat) ; 320 mg/m^3 (Mouse). (RTECS).

Acute effects May be fatal if inhaled or ingested in large quantity. Liquids or acid mists: May produce tissue damage: Mucous membranes (Eyes, mouth, respiratory tract). Extremely dangerous by eyes (conjunctivitis, permanent eye damage) and skin contact (Corrosive) (Severe skin burns, scars). Severe irritant for eyes : Inflammation (Redness, watering, itching). Very dangerous in case of inhalation at high concentrations (Mists) : May produce severe irritation of respiratory tract (Coughing, shortness of breath, choking). Maintain observation of the patient for delayed onset of pulmonary oedema.

Chronic effects	Target organs for acute and chronic overexposure (NIOSH 90-117) : Respiratory system, eyes, skin, teeth. **Acid mists** : Overexposure to strong inorganic mists containing sulfuric acid : Possibility of laryngeal cancer (HSBD, IARC). Possibility of irritation of the nose and throat with sneezing, sore throat or runny nose. Headache, nausea and weakness. Gross overexposure : Possibility of irritation of nose, throat, and lungs with cough, difficulty breathing or shortness of breath ; Pulmonary edema with cough, wheezing, abnormal lung sounds, possibly progressing to severe shortness of breath and bluish discoloration of the skin. Symptoms may be delayed. Repeated or prolonged exposure to mists may cause : Corrosion of teeth. **Contact (Skin)** : Possibility of corrosion, burns or ulcers. Contact with a 1 % solution: Possibility of slight irritation with itching, redness or swelling. Repeated or prolonged exposure (Mist) : Possibility of irritation with itching, burning, redness, swelling or rash. **Contact (Eye)** : Possibility of corrosion or ulceration (Blindness may result). Repeated or prolonged exposure (Mist) : Possibility of eye irritation with tearing, pain or blurred vision. **Ingestion :** Immediate effects of overexposure : Burns of the mouth, throat, esophagus and stomach, with severe pain, bleeding, vomiting, diarrhea and collapse of blood pressure. Damage may appear days after exposure.
Serious eye damage/eye irritation	Risk of serious damage to eyes. Effects of exposure on eye may include pain, redness, severe deep burns and loss of vision.
Irritation - Sensitization	Severe irritation: 5 mg/30 s, rinsing (eyes, rabbit). (RTECS). Sensitisation: Not known.
Germ cell mutagenicity	Cytogenetic analysis : 4 mmol/l (Ovaries, Hamster). (RTECS). Not teratogenic (Mice, rabbits)..
Carcinogenicity	Strong inorganic acid mists containing sulfuric acid: PROVEN (Human, Group 1, IARC) SUSPECTED (Human, Group A2, ACGIH) ; Group X (NTP) ; Classification not applicable to sulfuric acid and sulfuric acid solutions.
Reproductive toxicity	Inhalation (Lo CT) : 20 mg/m_3/7 hour (6-18 days pregnant) reproductive effects: Specific developmental abnormalities (Musculoskeletal system) (Rabbit). (RTECS).
STOT - single exposure	Test data conclusive but not sufficient for classification.
STOT - repeated exposure	Test data conclusive but not sufficient for classification.
Other adverse effects	Be aware that symptoms of lung oedema (shortness of breath) may develop up to 24 hours after exposure.
Aspiration hazard	Not classified.

Eating, drinking and smoking must be prohibited in areas where this material is handled and processed.
Wash hands and face before eating, drinking and smoking.

SECTION 12: Ecological information

12.1. Toxicity

Aquatic toxicity : Slightly to moderately toxic.
Toxicity to aquatic life increases with lowering pH. At pH lower than 5, only a few fish species can survive and at pH lower than 4, aquatic life is rare.

Chemical Name	Algae/aquatic plants	Fish	Crustacean
Sulfuric acid	-	Bluegill Sunfish *(Lepomis macrochirus)* 16 mg/l (LC50 ; 48 hours)	Flea water *(Daphnia magna)* > 100 mg/l. (EC5O, 48 h)

EYE : Concentrated compound is corrosive. 10 % solution : Moderate eye irritant.
SKIN : Concentrated compound is corrosive. 10 % solution: Slight skin irritant.
Single and repeated exposure : Irritation of the respiratory tract ; Corrosion of the respiratory tract ; Lung damage ; Labored breathing ; Altered respiratory rate ; Pulmonary oedema.

12.2. Persistence and degradability

Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants.

12.3. Bioaccumulative potential

The product is not bioaccumulating.
Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants without bioaccumulation.

12.4. Mobility in soil The product is water soluble and naturally present in soil as sulfate ions.

Mobility in soil
Easy soil seeping under rain action

Mobility
The product is water soluble and may spread in water systems.

12.5. Results of PBT and vPvB assessment

Not a PBT or vPvB substance or mixture.

12.6. Other adverse effects

The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic.
Due to the product's composition, particular attention must be taken for transportation and storage. Protect from rain because the run-off water will become acidic and may be harmful to flora and fauna.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste from residues/unused products Cleaned-up material may be an hazardous waste on *Resource Conservation and Recovery Act* (RCRA) on disposal due to the corrosivity characteristic. DO NOT flush to surface water or sanitary sewer system. Comply with Federal, State, and local regulations. If approved, neutralize and transfer to waste treatment system.

Contaminated packaging Since emptied containers retain product residue, follow label warnings even after containers is emptied.

Other Information No information available. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14: Transport information

Proof of classification

Classification of Sulfuric Acid as a Class 8 corrosive completed on January 9th 2015.
Based on existing studies, Sulfuric acid is corrosive if in contact with skin or eyes, or if inhaled or ingested.
Classified corrosive based on the classification method used in the *UN manual Tests and Criteria, referred to by Transport Canada, section 37, Test Methods and Criteria Related to Substances of Class 8.*
As the substance has been shown to be corrosive to skin under the criteria of the OECD guideline 404, it has been concluded that Sulfuric acid is also corrosive to metal and therefore falls under class 8.
Test references: *OECD; SIDS Initial Assessment Reports for Sulfuric Acid (CAS No: 7664-93-9) for 11th SIAM (January 2001).*

TDG (Canada) Class 8 Packing Group II Corrosive
Reportable Quantity Any Quantity

PIN UN1830 SULFURIC ACID PGll

DOT (USA)

UN/ID no.	1830
Proper shipping name	SULFURIC ACID with more than 51 % acid
Hazard Class	8
Subsidiary hazard class	-
Packing Group	II
DOT/IMO label	CORROSIVE
Reportable Quantity	1000 lbs (454 kg)
Shipping containers	Tank Cars, Tank Trucks, Vessel

IMDG

UN/ID no.	1830
Proper shipping name	SULFURIC ACID with more than 51 % acid
Hazard Class	8
Subsidiary hazard class	-
Packing Group	II
Marine pollutant	No
Environmental hazard	No
EmS-No.	F-A, S-B

ERG Guide 137

IMSBC Code Not applicable

MARPOL Non marine pollutant

Read safety instructions, SDS and emergency procedures before handling.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

CEPA DSL (Canada) CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): On the Domestic Substances List (DSL) ; Acceptable for use under the provisions of CEPA
Reportable Quantity : 5 l or 5 kg
Sulfuric Acid is a Class B Drug Precursor under *Health Canada's Controlled Drugs and Substances Act* and *Precursor Control Regulations*

USA	CERCLA Section 103 Hazardous substances (40 CFR 302.4); SARA Section 302 Extremely Hazardous Substances (40 CFR 355) : Yes; SARA Section 313, Toxic Chemicals (40 CFR 372.65) ; US: TSCA Inventory : Listed : Sulfuric acid (RQ) : 1 000 pounds (454 kg) Sulfuric Acid is subject to reporting requirements of Section 313, *Title III of the Superfund Amendments and Reauthorization Act of 1986* (SARA). 40 CFR Part 372. Certain companies must report emissions of Sulfuric Acid as required under *The Comprehensive Environmental Response. Compensation and Liability Act of 1980 (CERCLA),* 40 CFR Part 302 For more information call the *SARA Hotline* 800-424-9346. Strong Inorganic Acid Mists Containing Sulfuric Acid: Chemical listed effective March 14, 2003 to the *State of California. Proposal 65.* *U.S. FDA Food Bioterrorism Regulations* : These regulations apply to Sulfuric Acid when being distributed, stored or used for Food or Food Processing. TSCA (EPA, Toxic Substance Control Act) Chemical Inventory (40 CFR710) : Listed.
Classifications HCS (U.S.A.)	Corrosive liquid
European Union	Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

Authorizations and/or restrictions on use in EU:
This product does not contain substances subject to authorization (Regulation (EC) No. 1907/2006 (REACH), Annex XIV) This product does not contain substances subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII)

Persistent Organic Pollutants	Not applicable
Ozone-depleting substances (ODS) regulation (EC) 1005/2009	Not applicable

International Inventories

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

NFPA (National Fire Protection Association) (U.S.A.)

Fire Hazard	Reactivity	Health	Special Hazard
0	2	3	ACID

NPCA-HNIS Rating

Fire Hazard	Reactivity	Health
0	2	3

15.2. Chemical safety assessment

Chemical Safety Assessments have been carried out for these substances

SECTION 16: Other information

Key or legend to abbreviations and acronyms used in the safety data sheet

Indication of changes	Section 14 – Proof of classification

Full text of H-Statements and R phrases referred to under section 3
H314 - Causes severe skin burns and eye damage
R35 - Causes severe burns

Legend
CLP : Classification, labeling, packaging of substances and mixtures (REACH)
DNEL : Derived No-Effect Level (REACH)
DSD : Dangerous Substances Directive (Directive 67/548/EEC)
DPD : Dangerous Preparations Directive (Directive 1999/45/EC)
EMS : Revised Emergency Response Procedures for Ships Carrying Dangerous Goods(IMO)
HSDB : Hazardous Substances Data Bank (USA)
IARC : 1:nternational Agency for Research on Cancer.
NIOSH : National Institute of Occupational Safety and Health (USA)
NTP : U.S. National Toxicology Program (USA)
PNEC : Predicted No Effect Concentration
PBT : Persistent, bioaccumulative • toxic substances.
vPvB : Very persistent, very bioaccumulative substances.
REACH : Registration, Evaluation, Authorization and Restriction of Chemicals
RTECS : Registry of Toxic Effects of Chemical Substances (USA)
TWA : Total weight average
TLV : Threshold limit value
STOT : Specific target organ toxicity

References
- TLVs and BEls (2014). Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices. ACGIH, Cincinnati, OH - http://www.acgih.org
- CCOHS (2014) - Canadian Centre for Occupational Health and Safety- http://www.ccohs.ca/
- CSST (2013) - Commission de la Sante et de la Sécurité du Travail (Quebec). Service du répertoire toxicologique - http://www.reptox.csst.qc.ca/
- HSDB (2014) - Hazardous Substances Data Bank. TOXNET® Network of databases on toxicology, hazardous chemicals, and environmental health. NLM Databases & Electronic Resources, U.S. National Library of Medicine, NHI, 8600 Rockville Pike, Bethesda, MD 20894 - http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB
- IARC - Monographs on the Evaluation of Carcinogenic Risks to Humans (collection) - IARC Publications http://www.iarc.fr/en/websites/databases.php
- IMO (2012). CARRIAGE OF DANGEROUS GOODS. INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG) CODE ANNEXES AND SUPPLEMENTS. Revised Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS Guide).
- NIOSH U.S. (2014) - Pocket Guide to Chemical Hazards - http://www.cdc.gov/niosh/npg/
- RTECS (2014). Registry of Toxic Effects of Chemical Substances, NIOSH, CDC. NIOSH RTECS http://www.cdc.gov/niosh-rtecs/E U958940. html)
- Toxicologie industrielle & intoxication professionnelle, 3e édition, Lauwerys.
- TSCA (2014)-U.S. EPA Toxic Substance Control Act, Chemical Inventory.
System of Registries (SoR), Substance Registry Services
http://iaspub.epa.gov/sor_internet/registry/substreg/searchandretrieve/substancesearch/search.do

Issue Date 02-May-2016

Revision Date 02-May-2016

Previous revision date 09-Jan-2015

Revision Note
For further information, see NorFalco Inc. Sulfuric Acid «Storage and Handling Bulletin».
Because of its corrosive characteristics, Sulfuric Acid should not be used in sewer or drain cleaners or any similar application; regardless of whether they are formulated for residential, commercial or industrial use. NorFalco will not knowingly sell sulfuric acid to individuals or companies who repackage the product for sale as sewer or drain cleaners, or any other similar use.
The data in this Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.
For additional information, please visited our website : www.norfalco.com

Training Advice Follow training instructions when handling this material.

This material safety data sheet complies with the requirements of Occupational health legislation in Canada and with the Globally harmonized system (GHS).

Disclaimer Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. NorFalco Sales Inc.extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This safety data sheet provides guidelines for the safe handling and processing of this product: it does not and cannot advise on all possible situations, therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read end understand this information and be provided pertinent training prior to working with this product.

End of Safety Data Sheet

STEPHENSON PERSONAL CARE

SAFETY DATA SHEET

OPAL 517N

Compilation date: 17/12/2012

Revision date: 07/04/2015

Revision No: 4

Section 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: OPAL 517N

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of substance / mixture: PC39: Cosmetics, personal care products.

1.3. Details of the supplier of the safety data sheet

Company name: Stephenson Personal Care
Brookfoot House
Low Lane
Horsforth
Leeds
LS18 5PU
UK
Tel: +44(0)113 2050900
Fax: +44(0)113 2050901
Email: spc@stephensongroup.co.uk

1.4. Emergency telephone number

Emergency tel: 24hr Transport Emerg. Info +44 (0) 1865 407333
Non- UK emergency number: +44 (0) 7711 534236

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification under CHIP: This product has no classification under CHIP.

Classification under CLP: This product has no classification under CLP.

2.2. Label elements

Label elements: This product has no label elements.

2.3. Other hazards

PBT: This product is not identified as a PBT/vPvB substance.

Section 3: Composition/information on ingredients

3.2. Mixtures

[cont...]

Section 4: First aid measures

4.1. Description of first aid measures

Skin contact: Wash immediately with plenty of soap and water.

Eye contact: Bathe the eye with running water for 15 minutes.

Ingestion: Wash out mouth with water.

Inhalation: Consult a doctor.

4.2. Most important symptoms and effects, both acute and delayed

Skin contact: There may be mild irritation at the site of contact.

Eye contact: There may be irritation and redness.

Ingestion: There may be irritation of the throat.

Inhalation: There may be irritation of the throat with a feeling of tightness in the chest.

4.3. Indication of any immediate medical attention and special treatment needed

Immediate / special treatment: Not applicable.

Section 5: Fire-fighting measures

5.1. Extinguishing media

Extinguishing media: Suitable extinguishing media for the surrounding fire should be used.

5.2. Special hazards arising from the substance or mixture

Exposure hazards: In combustion emits toxic fumes.

5.3. Advice for fire-fighters

Advice for fire-fighters: Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Refer to section 8 of SDS for personal protection details.

6.2. Environmental precautions

Environmental precautions: Do not discharge into drains or rivers.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Wash the spillage site with large amounts of water.

6.4. Reference to other sections

Reference to other sections: Refer to section 8 of SDS.

Section 7: Handling and storage

7.1. Precautions for safe handling

Handling requirements: Avoid the formation or spread of dust in the air.

[cont...]

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a cool, well ventilated area.

Suitable packaging: Must only be kept in original packaging.

7.3. Specific end use(s)

Specific end use(s): No data available.

Section 8: Exposure controls/personal protection

8.1. Control parameters

Workplace exposure limits: No data available.

DNEL/PNEC Values

DNEL / PNEC No data available.

8.2. Exposure controls

Respiratory protection: Respiratory protective device with particle filter.

Hand protection: Protective gloves.

Eye protection: Safety glasses. Ensure eye bath is to hand.

Skin protection: Protective clothing.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State: Solid

Colour: Pale yellow

Odour: Characteristic odour

Solubility in water: Miscible

Flash point℃: 220 **pH:** 9.5 - 10.5

9.2. Other information

Other information: No data available.

Section 10: Stability and reactivity

10.1. Reactivity

Reactivity: Stable under recommended transport or storage conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions.

Decomposition may occur on exposure to conditions or materials listed below.

[cont...]

10.4. Conditions to avoid

Conditions to avoid: Heat.

10.5. Incompatible materials

Materials to avoid: Strong oxidising agents. Strong acids.

10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes.

Section 11: Toxicological information

11.1. Information on toxicological effects

Toxicity values: No data available.

Symptoms / routes of exposure

Skin contact: There may be mild irritation at the site of contact.

Eye contact: There may be irritation and redness.

Ingestion: There may be irritation of the throat.

Inhalation: There may be irritation of the throat with a feeling of tightness in the chest.

Section 12: Ecological information

12.1. Toxicity

Ecotoxicity values: No data available.

12.2. Persistence and degradability

Persistence and degradability: Biodegradable.

12.3. Bioaccumulative potential

Bioaccumulative potential: No bioaccumulation potential.

12.4. Mobility in soil

12.5. Results of PBT and vPvB assessment

PBT identification: This product is not identified as a PBT/vPvB substance.

12.6. Other adverse effects

Other adverse effects: Negligible ecotoxicity.

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal of packaging: Dispose of as normal industrial waste.

NB: The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

[cont...]

Section 14: Transport information

Transport class: This product does not require a classification for transport.

Section 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2. Chemical Safety Assessment

Chemical safety assessment: A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

Section 16: Other information

Other information

Other information: This safety data sheet is prepared in accordance with Commission Regulation (EU) No 453/2010.

Nature of Revision - Reach Regulations

Legal disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any damage resulting from handling or from contact with the above product.

Oxytrol

SDS Number: 0111 Revision Date: 9/18/2014

1 PRODUCT AND COMPANY IDENTIFICATION

Manufacturer

Alliance Group, Inc. 800-648-7339
N114 W18621 Clinton Drive
Germantown, WI 53022

Contact: CHEMTEL
Phone: 1-800-255-3924

Product Name:	Oxytrol
Revision Date:	9/18/2014
SDS Number:	0111
Common Name:	Sodium Sulfite
Product Code:	0111
Synonyms:	Sodium Sulfite
Product Use:	Water Treatment Compound

2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS):
- Health, Serious Eye Damage/Eye Irritation, 2 B
- Health, Skin corrosion/irritation, 3
- Health, Acute toxicity, 5 Oral

GHS Label elements, including precautionary statements

GHS Signal Word: WARNING

GHS Hazard Pictograms:

NO GHS PICTOGRAMS INDICATED FOR
THIS PRODUCT

GHS Hazard Statements:
- H320 - Causes eye irritation
- H316 - Causes mild skin irritation
- H303 - May be harmful if swallowed

GHS Precautionary Statements:
- P264 - Wash thoroughly after handling.
- P305+351+338 - IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
- P332+313 - If skin irritation occurs: Get medical advice/attention.
- P337+313 - Get medical advice/attention.

Hazards not otherwise classified (HNOC) or not covered by GHS

Route of Entry:	Eyes; Ingestion; Inhalation; Skin.
Inhalation:	Minimal respiratory tract irritation may occur with exposure to a large amount of material.
Skin Contact:	May cause irritation.
Eye Contact:	May cause irritation.
Ingestion:	Aspiration hazard: Harmful or fatal if swallowed.

HMIS III: Health = 1, Fire = 0, Physical Hazard = 0

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

Cas#	%	Chemical Name
7757-83-7	<50%	Sodium sulfite

4 FIRST AID MEASURES

Inhalation: If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention.

Skin Contact: Promptly flush skin with water until all chemical is removed.
Wash with soap and water. Remove contaminated clothing immediately. Get medical attention if needed.

Eye Contact: Immediately flush eyes with large amounts of water for at least 15 minutes, lifting eyelids occasionally to facilitate irrigation.
Get immediate medical attention.

Ingestion: If swallowed: If fully conscious, drink 1-2 glasses of water . Do NOT induce vomiting. Seek immediate medical attention. If unconscious, take to a hospital or physician. Never induce vomiting or give anything by mouth to an unconscious victim. For spontaneous vomiting, keep head below hips.

5 FIRE FIGHTING MEASURES

Flammability: Not flammable or combustible.
Flash Point: Not applicable
Autoignition Temp: None

Fire Fighting Methods
Evacuate area of unprotected personal. Wear protective clothing including NIOSH Approved self- contained breathing apparatus. Remain upwind of fire to avoid hazardous vapors and decomposition products. Use water spray to cool fire exposed containers and disperse vapors.

Extinguishing Media

Suitable: Use extingushing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable fire extinguisher: No data available.

Unusual Fire or Explosion Hazards: None known.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.
Environmental Precautions
Prevent further leakage or spillage if safe to do so. Do not let products enter drains. Discharge into the environment must be avoided.
Spill
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal. Provide ventilation to clear sulfur dioxide fumes which my be generated by the sodium sulfite component.

7 HANDLING AND STORAGE

Handling Precautions:	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors or mist. Consider normal working hygiene. Wash thoroughly after handling.
Storage Requirements:	Keep container tighly closed in a dry and well ventilated area. Do not freeze. Do not store in unlabeled or mislabeled containers.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:	Provide local exhaust ventilation. Maintain adequate ventilation.
Personal Protective Equipment:	Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Respiratory: No personal respiratory protective equipment is required. In case of dried material where dust can form, then use of respirator is needed. Eyes and Face: Wear chemical safety goggles while handling this product. Skin: For prolonged or repeated contact use protective gloves

Component	OSHA PEL	ACGIH TWA/ TLV
Sodium Sulfite	Not established	Not established

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, water white.
Physical State:	Liquid
Odor:	No odor.
Odor Threshold:	No data available.
Solubility:	Dispersible
Spec Grav./Density:	1.12-1.15 @ 25 C
Viscosity:	No data available.
Percent Volatile:	None
Boiling Point:	No data available.
Freezing/Melting Pt.:	No data available.
Flammability:	No data available.
Flash Point:	No data available.
Partition Coefficient:	No data available.
Vapor Pressure:	No data available.
Vapor Density:	No data available.
pH:	9-10
Evap. Rate:	No data available.
Bulk Density:	No data available.
Auto-Ignition Temp:	No data available.
Decomp Temp:	No data available.

Lower Explosion Limits: No data available.
Upper Explosion Limits: No data available.

10 STABILITY AND REACTIVITY

Stability:	Product is stable under normal conditions.
Conditions to Avoid:	Avoid elevated temperatures where sulfur dioxide may form gas or hazardous residues.
Materials to Avoid:	Acids. Oxidizing Agents. Nitrites. Nitrates.
Hazardous Decomposition:	Sulfur dioxide. Sulfur oxides. Sodium sulfide residue.
Hazardous Polymerization:	Will not occur under normal conditions.

11 TOXICOLOGICAL INFORMATION

Sodium sulfite (7757-83-7) [<25%]

Acute toxicity:
LD50 Oral - rat - 3,560 mg/kg
LC50 Inhalation - rat - 4 h - > 5,500 mg/m3
Dermal: no data available

Skin corrosion/irritation: Skin - rabbit Result: No skin irritation
Serious eye damage/eye irritation: Eyes - rabbit Result: Mild eye irritation

Respiratory or skin sensitisation: Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

Germ cell mutagenicity: no data available

Carcinogenicity:
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Sodium sulphite)
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: no data available

12 ECOLOGICAL INFORMATION

Sodium sulfite (7757-83-7) [<25%]

Toxicity to fish LC50 - Gambusia affinis (Mosquito fish) - 660 mg/l - 96 h.

Persistence and degradability: no data available

Bioaccumulative potential: no data available

Mobility in soil: no data available

Other adverse effects: no data available

13 DISPOSAL CONSIDERATIONS

Dispose of in accordance with local, state, and federal regulations. Since emptied containers retain product residue, follow label warnings even after container is emptied.

This material is not listed as a hazardous waste if and when it is discarded.

14 TRANSPORT INFORMATION

Not DOT regulated as a hazardous product.

15 REGULATORY INFORMATION

FEDERAL REGULATIONS

TSCA Inventory Status: All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements.
SARA Title III Section 311/312 Category:

- Immediate(Acute) Health Hazard: Yes
- Delayed (Chronic) Health Hazard: Yes
- Fire Hazard:No
- Sudden Release of Pressure Hazard: No
- Reactive Hazard:No

SARA Section 302/304/313/HAP:

Component	CERCLA RQ (LBS)	SARA RQ(LBS)	SARA TPQ(LBS)	SARA SEC 313	US EPA HAP
Sodium Sulfite	N/A	N/A	N/A	NO	NO

STATE REGULATIONS

California- The following components are listed under Prop 65: Lead <= 3ppm

Wisconsin- The following components are listed as a Wisconsin HAP: None.

16 OTHER INFORMATION

Complies with CFR Title 21 Section 173.310 for boiler water and steam which may contact dairy products

Publication Date: 9/18/2014
Prepared By: P. May
Reason for Revision: GHS update

This information is given in good faith and based on our current knowledge of the product.

Disclaimer:
Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility

regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

Safety Data Sheet

acc. to OSHA HCS

Printing date 11/05/2019 *Edition n° 12* *Reviewed on 11/05/2019*

1 Identification

* ***1.1 Product Identifier***
* **Trade name: PERMULSIN AO 300**
* **ITEM Code:** 1002743001
* ***1.2 Relevant identified uses of the substance or mixture and uses advised against***
No further relevant information available.

* ***1.3 Details of the supplier of the safety data sheet***
* **Manufacturer/Supplier:**
BOZZETTO, Inc
214 East JJ Drive, Suite F
Greensboro, NC 27406

Phone: 336-333-3526 - Toll Free: 866-888-8398
Fax: 336-333-7964

productsafety@bozzetto.it
* ***1.4 Emergency telephone number:*** Phone No : 1-800-535-5053

2 Hazard(s) identification

* ***2.1 Classification of the substance or mixture***
* **Classification according to Regulation (EC) No 1272/2008** The product is not classified, according to the CLP regulation.

* ***2.2 Label elements***
* **Labelling according to Regulation (EC) No 1272/2008** Not applicable
* **Hazard pictograms** Not applicable
* **Signal word** Not applicable
* **Hazard statements** Not applicable
* **Classification system:**
* **NFPA ratings (scale 0 - 4)**

Health = 0
Fire = 1
Reactivity = 0

* **HMIS-ratings (scale 0 - 4)**

Health = 0
Fire = 1
Reactivity = 0

* **Results of PBT and vPvB assessment**
* **PBT:** Not applicable.
* **vPvB:** Not applicable.

3 Composition/information on ingredients

* ***3.2 Chemical characterization: Mixtures***
* **Description:** Mixture of non-hazardous substances

(Contd. on page 2)

Safety Data Sheet

acc. to OSHA HCS

Printing date 11/05/2019 *Edition n° 12* *Reviewed on 11/05/2019*

Trade name: **PERMULSIN AO 300**

(Contd. of page 1)

* **Dangerous components:** Not applicable

4 First-aid measures

* ***4.1 Description of first aid measures***
* **General information:** No special measures required.
* **After inhalation:** Supply fresh air; consult doctor in case of complaints.
* **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
* **After eye contact:** Rinse opened eye for several minutes under running water.
* **After swallowing:** Drink copious amounts of water and provide fresh air. Immediately call a doctor.
* ***4.2 Most important symptoms and effects, both acute and delayed*** No further relevant information available.
* ***4.3 Indication of any immediate medical attention and special treatment needed*** No further relevant information available.

5 Fire-fighting measures

* ***5.1 Extinguishing media***
* **Suitable extinguishing agents:**
CO_2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
* ***5.2 Special hazards arising from the substance or mixture***
In certain fire conditions, traces of other toxic gases cannot be excluded, e.g.:
Carbon monoxide (CO)
* ***5.3 Advice for firefighters***
* **Protective equipment:**
Mouth respiratory protective device.
Do not inhale explosion gases or combustion gases.
Wear fully protective suit.
* **Additional information**
Cool endangered receptacles with water spray.
Dispose of fire debris and contaminated fire fighting water in accordance with official regulations.

6 Accidental release measures

* ***6.1 Personal precautions, protective equipment and emergency procedures***
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources
Use respiratory protective device against the effects of fumes/dust/aerosol.
Refer to point 8
* ***6.2 Environmental precautions:***
Do not allow product to reach sewage system or any water course.
In case of seepage into the ground inform responsible authorities.
Dilute with plenty of water.
Do not allow undiluted product to enter sewers/surface or ground water
* ***6.3 Methods and material for containment and cleaning up:***
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

(Contd. on page 3)

Safety Data Sheet

acc. to OSHA HCS

(Contd. of page 2)

* ***6.4 Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

* **Protective Action Criteria for Chemicals**

* **PAC-1:**		
7631-99-4	Sodium nitrate	4.1 mg/m³
* **PAC-2:**		
7631-99-4	Sodium nitrate	45 mg/m³
* **PAC-3:**		
7631-99-4	Sodium nitrate	270 mg/m³

7 Handling and storage

* ***7.1 Precautions for safe handling***
Keep receptacles tightly sealed.
Store in cool, dry place in tightly closed receptacles.
Keep away from heat and direct sunlight.
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Ensure that suitable extractors are available on processing machines
Use only in well ventilated areas.
Prevent formation of aerosols.
* **Information about protection against explosions and fires:** No special measures required.

* ***7.2 Conditions for safe storage, including any incompatibilities***
* **Storage:**
* **Requirements to be met by storerooms and receptacles:** No special requirements.
* **Information about storage in one common storage facility:** Not required.
* **Further information about storage conditions:** None.
* **Maximum storage temperature:** 50 °C
* **Minimum storage temperature:** 0 °C
* **Recommended storage temperature:** 10 ÷ 45 °C
* **Storage class:**
* **Class according to regulation on flammable liquids:** Not applicable
* ***7.3 Specific end use(s)*** No further relevant information available.

8 Exposure controls/personal protection

* ***8.1 Control parameters***
* **Components with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

(Contd. on page 4)

Safety Data Sheet

acc. to OSHA HCS

(Contd. of page 3)

* ***8.2 Exposure controls***
* **Personal protective equipment:**
* **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs and beverages.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Do not eat or drink while working.
Do not inhale gases / fumes / aerosols.
* **Breathing equipment:** Not required.
* **Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation (EN 374).
* **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
* **Penetration time of glove material**
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
* **Eye protection:** Goggles recommended during refilling.

9 Physical and chemical properties

* ***9.1 Information on basic physical and chemical properties***	
* **General Information**	
* **Appearance:**	
Form:	Fluid
Color:	Yellow
* **Odor:**	Characteristic
* **Odor threshold:**	Not determined.
* **pH-value at 20 °C (68 °F):**	6
* **Change in condition**	
Melting point/Melting range:	~0 °C (~32 °F) (OECD 102)
Boiling point/Boiling range:	100 °C (212 °F) (OECD 103)
* **Flash point:**	>100 °C (>212 °F) (DIN 51758)
* **Flammability (solid, gaseous):**	Not applicable.
* **Decomposition temperature:**	Not determined.
* **Auto igniting:**	Product is not selfigniting.
* **Danger of explosion:**	Product does not present an explosion hazard.
* **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
* **Oxidizing properties**	Not determined
* **Vapor pressure at 20 °C (68 °F):**	23 hPa (17.3 mm Hg)
* **Density at 20 °C (68 °F):**	1.16 g/cm³ (9.68 lbs/gal) (OECD 109)

(Contd. on page 5)

Safety Data Sheet

acc. to OSHA HCS

(Contd. of page 4)

* **Relative density**	Not determined.
* **Vapor density**	Not determined.
* **Evaporation rate**	Not determined.
* **Solubility in / Miscibility with**	
Water:	Fully miscible.
* **Partition coefficient (n-octanol/water):**	Not determined.
* **Viscosity:**	
Dynamic at 20 °C (68 °F):	520 mPas (OECD 111)
Kinematic:	Not determined.
* **Solvent content:**	
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
* ***9.2 Other information***	No further relevant information available.

10 Stability and reactivity

* ***10.1 Reactivity*** No further relevant information available.
* ***10.2 Chemical stability***
* **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
* ***10.3 Possibility of hazardous reactions*** No dangerous reactions known.
* ***10.4 Conditions to avoid*** No further relevant information available.
* ***10.5 Incompatible materials:*** No further relevant information available.
* ***10.6 Hazardous decomposition products:***
For combustion during a fire:
Carbon monoxide and carbon dioxide

11 Toxicological information

* ***11.1 Information on toxicological effects***
* **Acute toxicity:**
There is no data available on the product itself; the information given hereafter concern the toxicological behaviour of its components.
Literature data state LD-50 (oral-rat) > 2000 mg/Kg.

* **LD/LC50 values that are relevant for classification:**		
Oral	LD-50 (OECD 401)	>5,000 mg/kg (mouse)

* **Primary irritant effect:**
* **on the skin (Rabbit OECD 404):** Based on available data, the classification criteria are not met.
* **on the eye (Rabbit OECD 405):** Based on available data, the classification criteria are not met.
* **Sensitization (Guinea pig OECD 406):** Based on available data, the classification criteria are not met.
* **Additional toxicological information:**

* **Carcinogenic categories**

* **IARC (International Agency for Research on Cancer)**
None of the ingredients are listed.

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Safety Data Sheet

acc. to OSHA HCS

(Contd. of page 5)

* NTP (National Toxicology Program)
None of the ingredients are listed.

* OSHA-Ca (Occupational Safety & Health Administration)
None of the ingredients are listed.

12 Ecological information

* ***12.1 Toxicity***

* Aquatic toxicity:		
Oral	LC-50/96h (OECD 203)	>1,000 mg/l (Brachydanio Rerio)
	EC-50/96h (OECD 201)	13.5 mg/Kg (Scenedesmus Subspicatus)
	EC-50/48 h	>640 mg/l (Daphnia magna)

* ***12.2 Persistence and degradability*** > 80 % OECD 302 B
* **COD (Std Method 5220 D):** 500 mg/g
* ***12.3 Bioaccumulative potential*** No further relevant information available.
* ***12.4 Mobility in soil*** No further relevant information available.
* ***12.5 Results of PBT and vPvB assessment***
* **PBT:** Not applicable.
* **vPvB:** Not applicable.
* ***12.6 Other adverse effects*** No further relevant information available.

13 Disposal considerations

* ***13.1 Waste treatment methods***
* **Recommendation:**
Must not be disposed of together with household garbage. Do not allow UNDILUTED product to reach sewage system.
* **Waste disposal key:** 07 07 99
* **Uncleaned packagings:**
* **Recommendation:** Disposal must be made according to official regulations.
* **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

* *14.1 UN-Number*	
* DOT, ADR, ADN, IMDG, IATA	Not applicable
* *14.2 UN proper shipping name*	
* DOT, ADR, ADN, IMDG, IATA	Not applicable
* *14.3 Transport hazard class(es)*	
* DOT, ADR, ADN, IMDG, IATA	
* Class	Not applicable

(Contd. on page 7)

Safety Data Sheet

acc. to OSHA HCS

(Contd. of page 6)

* *14.4 Packing group*	
* **DOT, ADR, IMDG, IATA**	Not applicable
* *14.5 Environmental hazards:*	Not applicable.
* *14.6 Special precautions for user*	Not applicable.
* *14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code*	Not applicable.
* **Transport/Additional information:**	
* **ADR**	
* **Remarks:**	Not dangerous goods for transport by road.
* **IMDG**	
* **Remarks:**	Not dangerous goods for transport by sea.
* **IATA**	
* **Remarks:**	Not dangerous goods for transport by air.
* **UN "Model Regulation":**	Not applicable

15 Regulatory information

* *15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture*

* **Sara**

* **Section 302 (extremely hazardous substances):**		
None of the ingredients are listed.		
* **Section 313 (Specific toxic chemical listings):**		
None of the ingredients are listed.		
* **TSCA (Toxic Substances Control Act):**		
7732-18-5	Water	ACTIVE
* **Hazardous Air Pollutants**		
None of the ingredients are listed.		

* **Proposition 65**

* **Chemicals known to cause cancer:**
None of the ingredients are listed.
* **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients are listed.
* **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients are listed.
* **Chemicals known to cause developmental toxicity:**
None of the ingredients are listed.

(Contd. on page 8)

Safety Data Sheet

acc. to OSHA HCS

Printing date 11/05/2019 *Edition n° 12* *Reviewed on 11/05/2019*

Trade name: **PERMULSIN AO 300**

(Contd. of page 7)

* **National regulations:**
* **Classification according to VbF:** Not applicable
* **Water hazard class:** Water hazard class 1 (Self-assessment): slightly hazardous for water.

16 Other information

The Information contained herein is based on the present state of our knowledge and in compliance with 91/155/EC Directive (subsequent modifications and integrations) and 1907/2006/EC Regulation. However, we make no guarantees concerning specific product features and shall not establish a legally valid contractual relationship.
It is prohibited to use the product for any purposes different than those specified in the technical sheet and without receiving written instructions. We take no responsibility for unauthorized use.
It is always the responsibility of the user to take all necessary steps in order to assure compliance with all current local, state, and Federal regulations as for hygiene, safety and environment protection.
The information in this SDS is meant only as a description of the safety requirements of our product. It is not to be considered as a guarantee of the product properties.

* **Abbreviations and acronyms:**

ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VbF: Verordnung über brennbare Flüssigkeiten, Österreich (Ordinance on the storage of combustible liquids, Austria)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit

* **Sources**

NIOSH - Registry of toxic effects of chemical substances (1993)
CESIO - Classification and labelling of anionic, nonionic surfactants(01/2000)
SAX'S Dangerous Properties of Industrial Materials (1993)
ACGIH "2001 TLV"
TLV "2000/39/CE"
R.D.Swisher - Surfactants biodegradation
ECDIN DB
KBwS list

Safety Data Sheet
Limestone F Pulverized

Revision date:
05 January 2016

1. Identification

Product Name: High Calcium Limestone

Synonyms: #1 Grit, #3 Grit Coated, #3 Grit, #8's Limestone, 100 mesh, 100x0, 12mx50m, 12x50, 16 m x 100 m, 16x100, 16x140M, 16x200, 20x0, 20x200, 5x9M, 60x0, 62/200, 75-200, 78/200, 80/325, 85-200, 8mx20m, 8x20, 90/325, 90-325, 95-150M, Agricultural Stone-Large, Agricultural Stone-Small, Calcite, Feed grade HiCal, GFP 101, GFP 101WO, GFP 135, GFP 200C, GFP 250C, GFP 3, GFP 325, GFP 60C, GPS 20, GPS 325, Grade B, Grade F, Ground Limestone, Guideline Field Marker, Lut 95-150m, Pelletized Limestone, PREMIACAL, Pro Pulverized, Pro Select, Pulverized Limestone, ROM Stone, ROMF, Sinter Stone, Soil Doctor, Tuff Shell HiCal

Recommended Uses: Mineral filler, Manufacture of lime and lime related products, and aggregate

Distributor: Pestell Minerals & Ingredients Inc.

141 Hamilton Road
New Hamburg, ON N3A 2H1
Phone: (1) 519-662-2877
Email: qa@pestell.com

Emergency Contact: CANUTEC: (1) 613-996-6666 (24 hrs a day, 7 days a week)

2. Hazards Identification

GHS classification

Physical Hazards

None

Health Hazards

Skin irritation	Category 3
Eye irritation	Category 2B
Carcinogenicity	Category 1A
Specific Target Organ Toxicity – Repeated Exposure	Category 1

GHS Label Elements:

Signal Word: Danger

Hazard Statements:
Causes mild skin irritation
Causes eye irritation
May cause cancer through inhalation
Causes damage to lungs through prolonged or repeated exposure by inhalation

Precautionary Statements:
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust.
Wash thoroughly after handling.
Use personal protective equipment as required
Do not eat, smoke or drink when using this product

Pictograms:

3. Composition

Chemical name	% by weight	CAS#
Calcium carbonate	90+	1317-65-3
Magnesium carbonate	< 5	546-93-0
Silica-crystalline quartz	0.1 - 2	14808-60-7

4. First Aid Measures

Eyes: Flush victim's eyes thoroughly with large quantities of water, including under eye lids. Get medical attention if irritation persists.

Skin: Remove dusty clothing. Wash skin thoroughly with soap and water. Launder clothing before re-use. Get medical attention if irritation persists.

Ingestion: Get medical attention if a large amount is swallowed.

Inhalation: Remove victim to fresh air. If symptoms persist or breathing is difficult, get medical attention.

Most Important Symptoms: Eye and respiratory irritation due to exposure to dust.

Immediate medical attention / special treatment? No immediate medical attention anticipated.

5. Fire Fighting Measures

Suitable (and unsuitable) fire extinguishing media: Use extinguishing media appropriate for surrounding conditions.

Specific hazards arising from the product Decomposes at 950 ^{o}C to produce calcium oxide and magnesium oxide.

Special protective equipment and precautions for fire fighters Dust that becomes wet may cause surfaces to be extremely slippery and cause a slip hazard.

6. Accidental Release Measures

Personal precautions, protective equipment, emergency procedures:

Avoid eye and skin contact. Avoid generating airborne dust. Wear appropriate clothing to prevent skin contact. Wearing of standard SCBA should be adequate to protect against inhalation of dust.

Methods and materials for containment and clean up:

Utilize cleanup methods that minimize generating dust: vacuum. Avoid dry sweeping. Water may

be used to control dust, but wet dust can be very slippery and result in a slip hazard. Residue on surfaces may be removed with water or vinegar.

7. Handling & Storage

Safe Handling: Avoid skin and eye contact. Avoid generating airborne dust. An eye wash station should be readily available when this product is handled.

Safe Storage: Store in dry, well ventilated areas, away from incompatible materials.

8. Exposure Controls/Personal Protection

Occupational Exposure Limits

	OSHA PEL (mg/m^3)	ACGIH TLV (mg/m^3)	Ont. Reg. 833 TWAEV (mg/m^3)
Calcium carbonate	15 5 (respirable)	10	10
Magnesium carbonate	15 5 (respirable)	10	10
silica - crystalline quartz	30 / (% silica +2) (total) 10 / (% silica +2) (respirable)	0.025 (respirable)	0.1

Engineering Controls: Use with adequate general or local exhaust ventilation and to maintain exposure below occupational exposure limits.

Individual Protection Measures (Personal Protective Equipment):

Specific Eye / Face Protection: In windy conditions, or if work activity generates elevated airborne dust levels, dust proof or chemical goggles are recommended.

Specific Skin Protection: When prolonged skin contact is likely to occur, wear appropriate clothing and gloves.

Specific Respiratory Protection: If exposure limits are exceeded, an approved particulate respirator, or supplied air respirator, appropriate for the airborne concentrations, should be used. Selection and use of the respiratory protective equipment must be in accordance with applicable regulations and good industrial hygiene practices.

9. Physical & Chemical Properties

Appearance: Solid, white or grey powder or stone

Odor: Odorless

Odor threshold: Not Applicable

pH:	9.4 in saturated water solution at 25 °C (77 °F)
Melting Point/Freezing Point:	950 °C (1742 °F)
Boiling Point and range:	2850 °C (5162 °F)
Flash Point:	Not Applicable
Evaporation Rate:	Not Applicable
Flammability:	Not Available
Upper/lower flammability or explosive limits	Not Applicable
Vapor pressure/density:	Non Volatile
Relative density:	2.7
Solubility:	Slightly soluble in water: 0.013 g/L at 18 °C
Partition coefficient: n-octanol/water	Not Applicable
Auto-ignition temperature:	Not Available
Decomposition temperature:	950 °C (1742 °F)
Viscosity:	Not Applicable

10. Stability & Reactivity

Reactivity:	Not normally reactive.
Chemical stability:	Stable under normal storage and handling conditions.
Possibility of Hazardous Reactions:	Reacts with acids to form calcium salts while generating heat.
Conditions to avoid:	Vicinity of incompatible materials.
Incompatibility:	Incompatible with acids (reaction generates carbon dioxide gas and heat); reactive fluoridated, brominated or phosphorous compounds; aluminum (may form hydrogen gas), ammonium salts, mercury, hydrogen, magnesium, reactive powdered metals; organic acid anhydrides; nitro-organic compounds; interhalogenated compounds
Hazardous decomposition products:	Calcium oxide and carbon dioxide

11. Toxicological Information

Likely routes of exposure & symptoms:

Eyes:	Exposure to pulverized dust may cause irritation
Skin:	Exposure to pulverized dust may cause dryness and irritation
Ingestion:	No adverse effects expected for normal, incidental ingestion. If a large amount is swallowed, may cause gastrointestinal irritation, discomfort and blockage.

Inhalation: Exposure to pulverized dust may cause irritation in nose, throat and lungs

Chronic health effects:	This product contains trace amounts of crystalline silica. Prolonged or repeated inhalation of respirable crystalline silica can cause silicosis, as serious lung disease.
Respiratory or skin sensitization:	This material is not known to cause sensitization
Germ cell mutagenicity:	No data available.
Carcinogenicity:	This product is not listed as carcinogenic by OSHA, IARC, NTP, ACGIH, or the EU Directives. This product may contain trace amounts of crystalline silica quartz which is listed by IARC as "Carcinogenic to Humans" (Group 1) and "Known to be a Human Carcinogen" by NTP.
Reproductive toxicity:	No Data Available.
Numerical Measures of Toxicity	Crystalline Silica: Oral Rate LD_{50} > 22,500 mg/kg

12. Ecological Information

Because of the elevated pH of this product, it might be expected to produce some ecotoxicity upon exposure to certain aquatic organisms and aquatic systems in high concentrations
This material shows no bioaccumulation effect or food chain concentration toxicity.

13. Disposal Considerations

Dispose of contents in accordance with federal, state, provincial and local regulations.

14. Transport Information

This product is not classified as a hazardous material under US DOT or Canadian TDG regulations.

15. Regulatory Information

CERCLA Hazardous Substances	Not listed
SARA Toxic Chemical (40 CFR 372.65)	Not listed
SARA Section 302 Extremely Hazardous Substances (40 CFR 355)	Not listed
SARA 311/312	Not listed
SARA Section 313 Toxic Chemicals reporting requirements	none
Threshold planning quantity (TPQ)	Not listed
RCRA Hazardous Waste Classification (40 CFR 261)	Not Classified
EPA Toxic Substances Control Act (TSCA) Status	All of the components of this product are listed on the TSCA

California Proposition 65	Airborne crystalline silica particulates of respirable size are known to the State of California to cause cancer.
NFPA ratings	Health: 1 Fire: 0 Reactivity: 0
HMIS Ratings	Health: 1 Fire: 0 Reactivity: 0 Personal protection: A
OSHA Specifically regulated substance (29 CFR 1910)	Not listed
OSHA Air contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A)	Listed
MSHA	Not listed
Canada DSL	Listed
Canadian WHMIS Classification	D2A, Materials Causing other toxic effects.

Canada CPR	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation of Canada and this SDS contains all the required information.
Ontario Regulations	Refer to Regulation 845: Designated Substances - Silica

16. Other Information

List of GHS Hazard Statements:

H316: Causes mild skin irritation
H320: Causes eye irritation
H350: May cause cancer by inhalation
H372: Causes damage to lungs through prolonged or repeated exposure by inhalation.

List of GHS Precautionary Statements:

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe dust.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P281: Use personal protective equipment as required

Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act	IARC	International Agency for Research on Cancer
NTP	National Toxicology Program		

SAFETY DATA SHEET

1. Identification

Product identifier **DIESEL FUELS**

Other means of identification

SDS number 102-GHS

Synonyms Diesel Fuels All Grades, Diesel Fuel No.2, Fuel Oil No.2, High Sulfur Diesel Fuel, Low Sulfur Diesel Fuel, Ultra Low Sulfur Diesel Fuel, CARB (California Air Resource Board) Diesel Fuel, Off-Road Diesel Fuel, Dyed Diesel Fuel, X Grade Diesel Fuel, X-1 Diesel Fuel, R5 ULSD, B5 ULS D See section 16 for complete information.

Recommended use Motor Fuel
Refinery feedstock.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier Valero Marketing & Supply Company and Affiliates
One Valero Way
San Antonio, TX 78269-6000

General Assistance 210-345-4593

E-Mail CorpHSE@valero.com

Contact Person Industrial Hygienist

Emergency Telephone 24 Hour Emergency 866-565-5220
1-800-424-9300 (CHEMTREC USA)

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 3
Health hazards	Acute toxicity, inhalation	Category 4
	Skin corrosion/irritation	Category 2
	Carcinogenicity	Category 2
	Reproductive toxicity	Category 2
	Specific target organ toxicity, repeated exposure	Category 2
	Aspiration hazard	Category 1
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Flammable liquid and vapor. Harmful if inhaled. Causes skin irritation. Suspected of causing cancer. Suspected of damaging fertility or the unborn child. May cause damage to organs (blood, thymus, liver) through prolonged or repeated exposure. May be fatal if swallowed and enters airways.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Do not breathe mist/vapors/spray. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area.

Response	If skin irritation occurs: Get medical advice/attention. If inhaled: Remove person to fresh air and keep comfortable for breathing. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If exposed or concerned: Get medical advice/attention. If swallowed: Immediately call a poison center/doctor. Take off contaminated clothing and wash before reuse. In case of fire: Use foam, carbon dioxide, dry powder or water fog for extinction.
Storage	Store locked up. Store in a well-ventilated place. Keep cool.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Fuels, diesel, no. 2	68476-34-6	85 - 100
Biodiesel - Fatty acid methyl esters	67762-38-3	0 - 10
Fuels, diesel, C9-18-alkane branched and linear	1159170-26-9	0 - 5
n-Nonane	111-84-2	1 - 3
Octane (All isomers)	111-65-9	1 - 2
Hexane (Other isomers)	96-14-0	0 - 1
Naphthalene	91-20-3	0 - 1
n-Heptane	142-82-5	0 - 1
n-Hexane	110-54-3	0 - 1

4. First-aid measures

Inhalation	Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
Skin contact	Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, always seek medical attention.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
Ingestion	Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Do not give mouth-to-mouth resuscitation. If vomiting occurs, keep head low so that stomach content does not get into the lungs. Never give anything by mouth to a victim who is unconscious or is having convulsions. Get medical attention immediately.
Most important symptoms/effects, acute and delayed	Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash. The toxicological properties of this product have not been thoroughly investigated. Use appropriate precautions. Hydrogen sulfide, a highly toxic gas, may be present. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere.
Indication of immediate medical attention and special treatment needed	In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed. The toxicological properties of this material have not been fully investigated.
General information	If exposed or concerned: get medical attention/advice. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use.

5. Fire-fighting measures

Suitable extinguishing media	Water spray. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards arising from the chemical	The product is flammable, and heating may generate vapors which may form explosive vapor/air mixtures. Thermal decomposition or combustion may liberate toxic gases or fumes.
Special protective equipment and precautions for firefighters	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
Fire-fighting equipment/instructions	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Withdraw immediately in case of rising sound from venting safety devices or any discoloration of tanks due to fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. In the event of fire, cool tanks with water spray. Cool containers exposed to flames with water until well after the fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Water runoff can cause environmental damage. Use compatible foam to minimize vapor generation as needed.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Local authorities should be advised if significant spills cannot be contained. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the SDS for Personal Protective Equipment.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Local authorities should be advised if significant spillages cannot be contained. Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas. Use non-sparking tools and explosion-proof equipment. Small Spills: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste. Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Do not allow material to contaminate ground water system. Should not be released into the environment. Clean up in accordance with all applicable regulations.
Environmental precautions	If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Flammable. Review Firefighting Measures, Section 5, before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g. by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Use compatible foam to minimize vapor generation as needed. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 1-800-424-8802. For highway or railways spills, contact Chemtrec at 1-800-424-9300.

7. Handling and storage

Precautions for safe handling	Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Wear personal protective equipment. Avoid breathing mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Avoid prolonged exposure. Use only with adequate ventilation. Wash thoroughly after handling. The product is combustible, and heating may generate vapors which may form explosive vapor/air mixtures. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. When using, do not eat, drink or smoke. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities	Flammable liquid storage. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. The pressure in sealed containers can increase under the influence of heat. Keep container tightly closed in a cool, well-ventilated place. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Naphthalene (CAS 91-20-3)	PEL	50 mg/m3
		10 ppm
n-Heptane (CAS 142-82-5)	PEL	2000 mg/m3
		500 ppm
n-Hexane (CAS 110-54-3)	PEL	1800 mg/m3
		500 ppm
Octane (All isomers) (CAS 111-65-9)	PEL	2350 mg/m3
		500 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Fuels, diesel, no. 2 (CAS 68476-34-6)	TWA	100 mg/m3	Inhalable fraction and vapor.
Hexane (Other isomers) (CAS 96-14-0)	STEL	1000 ppm	
	TWA	500 ppm	
Naphthalene (CAS 91-20-3)	STEL	15 ppm	
	TWA	10 ppm	
n-Heptane (CAS 142-82-5)	STEL	500 ppm	
	TWA	400 ppm	
n-Hexane (CAS 110-54-3)	TWA	50 ppm	
n-Nonane (CAS 111-84-2)	TWA	200 ppm	
Octane (All isomers) (CAS 111-65-9)	TWA	300 ppm	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Hexane (Other isomers) (CAS 96-14-0)	Ceiling	1800 mg/m3
		510 ppm
	TWA	350 mg/m3
		100 ppm
Naphthalene (CAS 91-20-3)	STEL	75 mg/m3
		15 ppm
	TWA	50 mg/m3
		10 ppm
n-Heptane (CAS 142-82-5)	Ceiling	1800 mg/m3
		440 ppm
	TWA	350 mg/m3
		85 ppm
n-Hexane (CAS 110-54-3)	TWA	180 mg/m3
		50 ppm
n-Nonane (CAS 111-84-2)	TWA	1050 mg/m3
		200 ppm
Octane (All isomers) (CAS 111-65-9)	Ceiling	1800 mg/m3
		385 ppm
	TWA	350 mg/m3
		75 ppm

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
n-Hexane (CAS 110-54-3)	0.4 mg/l	2,5-Hexanedion, without hydrolysis	Urine	*
	0.4 mg/l	2,5-Hexanedi - on, without hydrolysis		*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

n-Hexane (CAS 110-54-3)	Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Fuels, diesel, no. 2 (CAS 68476-34-6)	Can be absorbed through the skin.
Naphthalene (CAS 91-20-3)	Can be absorbed through the skin.
n-Hexane (CAS 110-54-3)	Can be absorbed through the skin.

Appropriate engineering controls Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.

Skin protection

Hand protection Wear chemical-resistant, impervious gloves. Suitable gloves can be recommended by the glove supplier. Be aware that the liquid may penetrate the gloves. Frequent change is advisable.

Other Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.

Respiratory protection Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn. Proper respirator selection should be determined by adequately trained personnel, based on the contaminants, the degree of potential exposure and published respiratory protection factors. This equipment should be available for nonroutine and emergency use.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Consult supervisor for special handling instructions. Avoid contact with eyes. Avoid contact with skin. Keep away from food and drink. Wash hands before breaks and immediately after handling the product. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance Liquid (may be dyed red).

Physical state Liquid.

Form Liquid.

Color Clear. Straw.

Odor Kerosene (strong).

Odor threshold Not available.

pH Not available.

Melting point/freezing point -60.07 °F (-51.15 °C) Estimated

Initial boiling point and boiling range 325 - 700 °F (162.78 - 371.11 °C)

Flash point > 100.0 °F (> 37.8 °C) Closed Cup

Evaporation rate 0.02

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	0.4 %
Flammability limit - upper (%)	8 %
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	< 1 mm Hg (20°C)
Vapor density	3 (Air = 1)
Relative density	0.82 - 0.87
Relative density temperature	60 °F (15.56 °C)
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	494.96 °F (257.2 °C)
Decomposition temperature	Not available.
Viscosity	2 - 4.5 mm²/s

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Stable under normal temperature conditions and recommended use.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Ingestion	May be fatal if swallowed and enters airways.
Inhalation	Harmful if inhaled. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea.
Skin contact	Causes skin irritation.
Eye contact	May cause eye irritation.
Symptoms related to the physical, chemical and toxicological characteristics	Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash. The toxicological properties of this product have not been thoroughly investigated. Use appropriate precautions.

Information on toxicological effects

Acute toxicity	Harmful if inhaled. Harmful: may cause lung damage if swallowed. The toxicological properties of this material have not been fully investigated.

Components	**Species**	**Test Results**
Fuels, diesel, no. 2 (CAS 68476-34-6)		
Acute		
Inhalation		
LC50	Rat	4.1 mg/l, 4 hours

Components	Species	Test Results
Naphthalene (CAS 91-20-3)		
Acute		
Dermal		
LD50	Rabbit	> 2 g/kg
Oral		
LD50	Rat	490 mg/kg
n-Heptane (CAS 142-82-5)		
Acute		
Inhalation		
LC50	Rat	103 mg/l, 4 Hours
n-Hexane (CAS 110-54-3)		
Acute		
Oral		
LD50	Rat	28710 mg/kg
n-Nonane (CAS 111-84-2)		
Acute		
Inhalation		
LC50	Rat	3200 mg/l, 4 Hours
Octane (All isomers) (CAS 111-65-9)		
Acute		
Inhalation		
LC50	Rat	118 mg/l, 4 Hours

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Based on available data, the classification criteria are not met.

Respiratory or skin sensitization

Respiratory sensitization Based on available data, the classification criteria are not met.

Skin sensitization Based on available data, the classification criteria are not met.

Germ cell mutagenicity Based on available data, the classification criteria are not met.

Carcinogenicity Suspected of causing cancer.
International Agency for Research on Cancer (IARC): Whole diesel engine exhaust – IARC Group 1. Exposure may cause lung cancer and also noted a positive association with an increased risk of bladder cancer.
Diesel exhaust has been reported to be an occupational hazard due to NIOSH-reported potential carcinogenic properties.

IARC Monographs. Overall Evaluation of Carcinogenicity

Fuels, diesel, no. 2 (CAS 68476-34-6)	3 Not classifiable as to carcinogenicity to humans.
Naphthalene (CAS 91-20-3)	2B Possibly carcinogenic to humans.

NTP Report on Carcinogens

Naphthalene (CAS 91-20-3)	Reasonably Anticipated to be a Human Carcinogen.

Reproductive toxicity Suspected of damaging fertility or the unborn child.
Napthalene interferes with embryo development in experimental animals at dose levels that cause maternal toxicity. In humans, excessive exposure to this agent may cause hemolytic anemia in the mother and fetus.

Specific target organ toxicity - single exposure Based on available data, the classification criteria are not met.

Specific target organ toxicity - repeated exposure May cause damage to the following organs through prolonged or repeated exposure: Blood. Liver. Thymus.

Aspiration hazard May be fatal if swallowed and enters airways.

Chronic effects Contains organic solvents which in case of overexposure may depress the central nervous system causing dizziness and intoxication. Repeated exposure to naphthalene may cause cataracts, allergic skin rashes, destruction of red blood cells, and anemia, jaundice, kidney and liver damage. Danger of serious damage to health by prolonged exposure. Prolonged or repeated overexposure may cause central nervous system, kidney, liver, and lung damage.

Further information Symptoms may be delayed. Hydrogen sulfide, a highly toxic gas, may be present. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. Toxicological properties of this material have not been fully investigated.

12. Ecological information

Ecotoxicity Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Components		Species	Test Results
Fuels, diesel, no. 2 (CAS 68476-34-6)			
Aquatic			
Acute			
Crustacea	EL50	Daphnia magna	68 mg/l, 48 hours
Fish	LL50	Oncorhynchus mykiss	65 mg/l, 96 hours
Naphthalene (CAS 91-20-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	1.09 - 3.4 mg/l, 48 hours
Fish	LC50	Pink salmon (Oncorhynchus gorbuscha)	0.95 - 1.62 mg/l, 96 hours
n-Heptane (CAS 142-82-5)			
Aquatic			
Fish	LC50	Western mosquitofish (Gambusia affinis)	4924 mg/l, 96 hours
n-Hexane (CAS 110-54-3)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	2.101 - 2.981 mg/l, 96 hours

Persistence and degradability Not available.

Bioaccumulative potential Not available.

Partition coefficient n-octanol / water (log Kow)

Hexane (Other isomers) (CAS 96-14-0)	3.6
Octane (All isomers) (CAS 111-65-9)	5.18
n-Heptane (CAS 142-82-5)	4.66
n-Hexane (CAS 110-54-3)	3.9
n-Nonane (CAS 111-84-2)	5.46

Mobility in soil Not available.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Dispose in accordance with all applicable regulations. This material and its container must be disposed of as hazardous waste. Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container.

Hazardous waste code D001: Waste Flammable material with a flash point <140 °F

US RCRA Hazardous Waste U List: Reference

Naphthalene (CAS 91-20-3) U165

Waste from residues / unused products Dispose of in accordance with local regulations.

Contaminated packaging Offer rinsed packaging material to local recycling facilities.

14. Transport information

DOT

UN number UN1202

UN proper shipping name Diesel fuel

Transport hazard class(es)

Class Combustible Liquid

Subsidiary risk -

Packing group III

Environmental hazards

Marine pollutant	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	144, B1, IB3, T2, TP1
Packaging exceptions	150
Packaging non bulk	203
Packaging bulk	242

IATA

UN number	UN1202
UN proper shipping name	Diesel fuel
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	III
Environmental hazards	Yes
ERG Code	3L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1202
UN proper shipping name	DIESEL FUEL
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	F-E, S-E
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.

15. Regulatory information

US federal regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

n-Nonane (CAS 111-84-2)	1.0 % One-Time Export Notification only.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Hexane (Other isomers) (CAS 96-14-0)	LISTED
Naphthalene (CAS 91-20-3)	LISTED
n-Heptane (CAS 142-82-5)	LISTED
n-Hexane (CAS 110-54-3)	LISTED
n-Nonane (CAS 111-84-2)	LISTED
Octane (All isomers) (CAS 111-65-9)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - No Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Naphthalene	91-20-3	0 - 1

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Naphthalene (CAS 91-20-3)
n-Hexane (CAS 110-54-3)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Hexane (Other isomers) (CAS 96-14-0)
Naphthalene (CAS 91-20-3)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
n-Nonane (CAS 111-84-2)
Octane (All isomers) (CAS 111-65-9)

US. New Jersey Worker and Community Right-to-Know Act

Fuels, diesel, no. 2 (CAS 68476-34-6)
Naphthalene (CAS 91-20-3)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
n-Nonane (CAS 111-84-2)
Octane (All isomers) (CAS 111-65-9)

US. Pennsylvania Worker and Community Right-to-Know Law

Fuels, diesel, no. 2 (CAS 68476-34-6)
Hexane (Other isomers) (CAS 96-14-0)
Naphthalene (CAS 91-20-3)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
n-Nonane (CAS 111-84-2)
Octane (All isomers) (CAS 111-65-9)

US. Rhode Island RTK

Naphthalene (CAS 91-20-3)
n-Hexane (CAS 110-54-3)

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Benzene (CAS 71-43-2)
Toluene (CAS 108-88-3)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

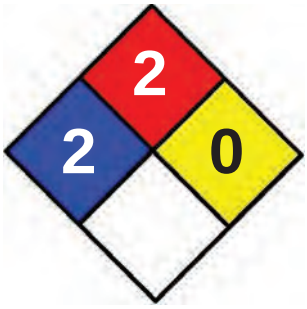
Issue date 13-May-2013

Revision date 23-May-2014

Version # 04

Further information HMIS® is a registered trade and service mark of the NPCA.

NFPA Ratings



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Holland Company

Since 1967

Liquid Sodium Bisulfite

Material Safety Data Sheet

HMIS: H = 1, F = O, R = 1, PPE = see sec. 11

Section 1 – Chemical Product and Company Identification

Product/Chemical name: Liquid Sodium Bisulfite **Chemical family:** Bisulfite sodium salt	**General Use:** Water treatment chemical **Emergency Contact:** 800-424-9300 Chemtrac
Manufacturer's Name: Holland Company Inc.	**Telephone Number:** 413-743-1292
Address (Number, Street, City, State and Zip Code) 153 Howland Avenue Adams, MA 01220	**FAX:** 413-743-1298 **Date Prepared:** June 2012 (rev)

Section 2 – Composition

Name: Bisulfite sodium salt $NaHSO_3 \bullet x\ H_2O$ CAS# 7631-90-5 % weight = 25-40%

	OSHA PEL		ACGIH TLV		NIOSH REL	
Ingredient	TWA	STEL	TWA	STEL	TWA	STEL
Sodium Bisulfite (dry)	5mg/m³	none estab.	5 mg/m³	none estab.	5 mg/m³	none estab.

Section 3 - Emergency Overview

Description: Clear to slightly hazy amber colored liquid. Pungent odor. Not volatile. Not flammable.

Hazards: Liquid is harmful if swallowed. Inhalation of vapor may cause an allergic reaction in some asthmatics / sulfite sensitive persons. If symptoms occur seek immediate medical care. Contact with liquid will irritate eyes, and skin.

Section 4 - First Aid Procedures

Inhalation of liquid:	Remove from exposure; if symptoms develop seek immediate medical treatment.
Eye contact:	Immediately flush with water continue for at least 15 minutes. Seek immediate medical attention.
Ingestion:	Do not induce vomiting. Drink milk or water. Immediately seek medical attention.
Skin contact:	Wash off area of contact. If symptoms occur seek medical attention.

Section 5 – Physical and Chemical Properties

Boiling Point: >104°C	**pH:** 3.5-5.0	**Specific Gravity:** >1.3 S.G	
Vapor Pressure (mm Hg.): 78mm	**% VOC:** 0.0	**Freeze Point:** <11C	
Vapor Density (AIR -1): NA	**Odor:** pungent	**Physical state:** Liquid	
Solubility in Water: Complete	**Appearance:** Clear to slight haze	**Color:** Amber	

Section 6 - Fire Fighting Measures

Flammability classification: Not flammable **Flash Point:** NA **Auto Ignition:** NA	**Burn Rate:** NA	**LEL:**NA	**UEL:** NA

Hazardous combustion products: see section 7 **Extinguishing Media:** All agents suitable for the surrounding fire.

Fire Fighting Instructions: Keep storage tanks cool. When release of SO_2 gas is possible wear self-contained breathing apparatus.

Unusual Fire and Explosion Hazards: Thermal decomposition can lead to the release of hazardous gases, sulfur dioxide.

Section 7 – Stability and Reactivity

Stability: Stable at room temperatures			**Materials to Avoid:** Mineral acids and strong oxidizers
Conditions to avoid: High temperatures			**Polymerization:** under normal conditions hazardous polymerization will not occur

Chemical Incompatibility: Acids and oxidizers.

Hazardous Decomposition Products: At elevated temperatures sulfur dioxide and sulfur oxides can evolve.

Section 8 - Health Hazard Information

Primary Entry Routes: Skin, inhalation, ingestion **Target organs:** No data

Acute Effects: Possible severe allergic reaction in some asthmatics and sulfite hypersensitive persons. Irritant to eyes and skin.

Carcinogenicity: IARC, NTP, and OSHA do not list as a carcinogen.

Chronic Effects: IARC, NTP, and OSHA list no evidence showing that any of the ingredients affect reproduction or cause cancer.

Medical Conditions Aggravated by long Term Exposure: No data.

Ingestion: Harmful if swallowed. **Eye:** Irritation, possible damage.

Liquid Sodium Bisulfite

Section 9 - Spill, Leak, and Disposal Procedures

Spill / Leak procedures: Spill procedures are dictated by site wastewater flow controls and will vary by site. General procedures are offered in this document, but authorization for any wastewater - residuals discharge, or disposal must be obtained from the controlling local, state, or federal agencies prior to discharge.

Small Spills: Neutralize and absorb with soda ash, or lime. Clean area with water and absorbent materials.

Large Spills: Provide containment of the liquid spill to control the spread. Do not release into sewers without first getting authorization from the controlling local, state, or federal agencies. Spill residue can be neutralized with soda ash, or lime.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

State / Province specific regulations have not been determined.

Disposal: Follow Federal, State, Province, and Local regulations.

Section 10 - Regulatory Information

General Review:
Current regulations and lists may have changed from those shown below.
Check with appropriate Local, State, Province, and Federal agencies for any updates to the following information.

EPA Regulations:

RCRA Hazardous waste:	Not listed
CERCLA Hazardous Substance:	Listed
SARA 311/312 Category:	Acute (immediate) health hazard
EPCRA 313 Toxic Chemical (40 CFR 372.65):	Not Listed
SARA Extremely Hazardous Substance:	Not Listed
CERCLA Reportable Quantity (RQ):	5,000lbs 100% dry basis 1,180 gallons liquid sodium bisulfite (38% basis)

OSHA Regulations:

Air (29 CFR 1910.1000, table Z-1, Z-1-A):	Not Listed
OSHA Regulated substance (29 CFR 1910):	Not Listed

TSCA Section 8(b) – Inventory Status:
All chemicals in product are either exempt or listed on the TSCA inventory.

State regulations: State/Province specific regulations have not been determined by Holland Company Inc.

Section 11 – Exposure Controls / Personal Protection

Ventilation: In work areas use local exhaust ventilation, active or passive as necessary to provide adequate ventilation.

Respiratory Protection: As deemed appropriate in conditions without adequate ventilation select proper respiratory protection following OSHA/NIOSH regulations and recommendations.

Protective Equipment / Clothing: If contact is possible use protective eye and face glasses/goggles/shields per most recent OSHA standards. Use rubber gloves if handling product. Use impervious foot covering if work will include immersion of shoes or boots in liquid. Wear clothing that will protect skin from direct contact with product. Launder contaminated clothing before using.

Wash Stations: Full drench showers and eye wash stations should be made available in the work area.

Comments:

Always wash hands when leaving the work area. Never eat or drink, use the toilet, or take medicine without first washing.

Section 12 – Precautions and Comments

Handling Precautions: Make certain all containers are properly labeled. Keep storage containers out of direct sun and away from sources of heat and ignition to prevent decomposition and release of SO2 gas. Prevent mixing with acids and oxidizing materials.

Storage and transfer: Store in Plastic, FRP, Stainless steel. For transfer use non-metallic, stainless steel or lined pumps, lines, and valves. Keep liquid above 50F to avoid crystallization.

Other Precautions: ANSI 60 limit Maximum Use for Potable Water treatment = 45 mg/l

Section 13 – DOT Transportation Data

Shipping Name: UN2693 Bisulfites, Aqueous Solutions N.O.S. (sodium bisulfite solution)
Hazard Class: 8
DOT No.: UN2693
Packing Group: III
Label: Corrosive liquid

Disclaimer: The information presented herein is believed to be accurate and reliable, but is given without guaranty or warranty, expressed or implied. The user should not assume that all safety measures are indicated so that other measures may not be required. The user is responsible that the product is used and stored in a safe manner that complies with all appropriate legal standards and requirements.

BRENNTAG Southeast

MATERIAL SAFETY DATA SHEET

REVISION OF: 10/17/07. MSDS #2370

SODIUM HYDROXIDE 50%

1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SUPPLIER: BRENNTAG SOUTHEAST, INCORPORATED
2000 E. PETTIGREW STREET
DURHAM, NC 27703

EMERGENCY SPILL INFORMATION:
(800) 424-9300 CHEMTREC (USA)
OTHER PRODUCT SAFETY INFORMATION
(919) 596-0681

PRODUCT NAME: SODIUM HYDROXIDE 50% ALL GRADES

COMMON NAMES/SYNONYMS: CAUSTIC SODA 50%

FORMULA: MIXTURE

DATE ISSUED: 10/17/07

HAZARD RATING (NFPA 704)
HEALTH: 3
FIRE: 0
REACTIVITY: 1
SPECIAL: NONE

HAZARD RATING SCALE:
0=MINIMAL 3=SERIOUS
1=SLIGHT 4=SEVERE
2=MODERATE

2.0 COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	EXPOSURE LIMITS, PPM OSHA PEL	ACGIH TLV	OTHER LIMIT	HAZARD	CAS NO.
SODIUM HYDROXIDE	2	2		CORROSIVE	1310-73-2

3.0 HAZARDS IDENTIFICATION

NOTE TO PHYSICIAN:

PRIMARY ROUTES OF EXPOSURE: SEVERE BURNS TO EYES AND SKIN IMMEDIATE TREATMENT IS NECESSARY, INGESTION DAMAGES MUCOUS MEMBRANES AND TISSUES OF GASTRO-INTESTINAL TRACT.

SIGNS AND SYMPTOMS OF EXPOSURE:

INHALATION: EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY DAMAGE, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, VOMITING, DIARRHEA, AND POSSIBLE UNCONSCIOUSNESS.

EYE CONTACT: LIQUID AND MISTS ARE CORROSIVE TO THE EYES. BRIEF CONTACT OF THE LIQUID CAUSES SEVERE EYE BURNS AND POSSIBLE BLINDNESS.

SKIN CONTACT: CONTACT WITH VAPORS, MISTS, AND LIQUID ARE CORROSIVE TO THE SKIN, AND CAUSE PERMANENT SKIN AND DAMAGE.

SWALLOWED: SWALLOWING LIQUID MAY CAUSE PERMANENT GASTROINTESTINAL DAMAGE.
CHRONIC EFFECTS OF EXPOSURE:

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: PERSONS WITH PRE-EXISTING SKIN OR EYE DISORDERS OR RESPIRATORY DISEASE MAY BE MORE SUSCEPTIBLE TO THE EFFECTS OF THIS MATERIAL.

4.0 FIRST AID MEASURES

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GIVE OXYGEN IF NECESSARY. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 30 MINUTES, LIFTING THE UPPER AND LOWER LIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF SKIN CONTACT: IMMEDIATELY FLUSH SKIN WITH LOTS OF RUNNING WATER FOR 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE RE-USE. GET MEDICAL ATTENTION IF CONDITION PERSISTS.

IF SWALLOWED: DO NOT INDUCE VOMITING. IF CONSCIOUS GIVE 2 GLASSES OF WATER OR MILK. GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON.

5.0 FIRE FIGHTING MEASURES

FLASH POINT, DEG F: N/A
METHOD USED: TCC

FLAMMABLE LIMITS IN AIR, % (VOL)
LOWER: N/A UPPER: N/A

EXTINGUISHING MEDIA: DOES NOT BURN. APPLYING WATER TO THIS PRODUCT MAY CAUSE SPLATTERING OF THIS CORROSIVE LIQUID DRY CHEMICAL, FOAM OR CO2. WATER SPRAY ON LARGE FIRES MAY BE INEFFECTIVE BUT SHOULD BE USED TO COOL EXPOSED STRUCTURES OR VESSELS. DO NOT USE A DIRECT WATER STREAM.

SPECIAL FIRE FIGHTING PROCEDURES: FIRE FIGHTERS SHOULD WEAR SELF-CONTAINED POSITIVE PRESSURE BREATHING APPARATUS. USE WATER SPRAY TO COOL NEARBY CONTAINERS AND STRUCTURES EXPOSED TO FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS: EXTINGUISH ALL NEARBY SOURCES OF IGNITION, VAPORS ARE HEAVIER THAN AIR AND MAY BE MOVED ALONG GROUND BY AIR CURRENTS TO DISTANT IGNITION SOURCES.

6.0 ACCIDENTAL RELEASE MEASURES

ACTION TO TAKE FOR SPILLS OR LEAKS: ELIMINATE IGNITION SOURCES. WEAR CHEMICAL RESISTANT SLICKER SUIT AND COMPLETE PROTECTIVE EQUIPMENT INCLUDING RESISTANT GLOVES, RESISTANT BOOTS, CHEMICAL GOGGLES, AND FACE SHIELD. FOR SMALL SPILLS OR DRIPS, MOP OR WIPE UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, CONTAIN BY DIKING WITH SOIL OR OTHER ABSORBENT MATERIAL AND COLLECT MATERIAL FOR PROPER DISPOSAL. ABSORBENT MATERIALS MUST ALSO BE DISPOSED OF PROPERLY. KEEP MATERIAL OUT OF SEWERS, STORM DRAINS, SURFACE WATERS, AND SOIL. IF SPILL OCCURS INDOORS, TURN OFF AIR CONDITIONING AND/OR HEATING SYSTEM TO PREVENT VAPORS FROM CONTAMINATING OTHER INDOOR AREAS.

COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING AND HANDLING AND DISPOSAL OF WASTE.

7.0 HANDLING & STORAGE

HANDLING AND STORAGE PRECAUTIONS: KEEP AWAY FROM HEAT, SPARKS, AND FLAMES. STORE IN A COOL, DRY PLACE. DO NOT EXPOSE TO TEMPERATURES ABOVE 120° FAHRENHEIT. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. DO NOT USE PRESSURE TO EMPTY CONTAINER. WASH SKIN THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

REPAIR AND MAINTENANCE PRECAUTIONS: DO NOT CUT, GRIND, WELD, OR DRILL ON OR NEAR CONTAINERS.

OTHER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL RETAIN PRODUCT RESIDUE AND VAPORS. ALWAYS OBEY HAZARD WARNINGS AND HANDLE EMPTY CONTAINERS AS IF THEY WERE FULL. CONTACT WITH ALUMINUM PARTS IN A PRESSURIZABLE FLUID SYSTEM MAY CAUSE VIOLENT REACTIONS. CONSULT EQUIPMENT SUPPLIER FOR FURTHER INFORMATION.

8.0 EXPOSURE CONTROLS/PERSONAL PROTECTION

VENTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MAINTAINING EMISSIONS AT THE POINT OF USE BELOW THE LOWEST TLV.

RESPIRATORY PROTECTION: NIOSH-APPROVED CANISTER RESPIRATOR IN THE ABSENCE OF ADEQUATE ENVIRONMENTAL CONTROLS AT THE POINT OF USE. USE SELF-CONTAINED BREATHING APPARATUS IN CONFINED OR ENCLOSED SPACES.

EYE PROTECTION: CHEMICAL GOGGLES WITH FULL FACE SHIELD. CONTACT LENSES SHOULD NOT BE WORN.

PROTECTIVE CLOTHING: LONG-SLEEVED SHIRT, TROUSERS, SAFETY SHOES. PRODUCT RESISTANT GLOVES, APRON, AND BOOTS MADE OF NEOPRENE OR VINYL.

OTHER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE NEARBY, UNOBSTRUCTED AND READY FOR USE. PROTECTIVE EQUIPMENT SHOULD BE SELECTED, USED, AND MAINTAINED ACCORDING TO APPLICABLE STANDARDS.

9.0 CHEMICAL AND PHYSICAL PROPERTIES

BOILING POINT, DEG F: 284
MELTING POINT, DEG F: LESS THAN 0
SPECIFIC GRAVITY (WATER=1): 1.53
APPEARANCE AND ODOR: COLORLESS LIQUID; SWEET, PUNGENT ODOR

VAPOR PRESSURE, MM HG/20 DEG C: 1.5
VAPOR DENSITY (AIR=1): N/A
WATER SOLUBILITY, %: COMPLETE
EVAPORATION RATE (BUTYL ACETATE=1): N/A

10. STABILITY AND REACTIVITY.

STABILITY: STABLE

POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, SPARKS, AND OPEN FLAMES.

MATERIALS TO AVOID: OXIDIZING OR REDUCING MATERIALS, MINERAL ACIDS, REACTIVE METALS (I.E., ALUMINUM, TIN, ZINC, AND THEIR ALLOYS) HYDROCARBONS

HAZARDOUS DECOMPOSITION PRODUCTS: MAY LIBERATE CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN.

11. TOXICOLOGICAL INFORMATION

CAUSTIC SODA: NO INFORMATION

12.0 ECOLOGICAL INFORMATION

ECOLOGICAL TESTING HAS NOT BEEN CONDUCTED ON THIS PRODUCT BY BRENNTAG SOUTHEAST

13.0 DISPOSAL INFORMATION

DISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED IN CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPROPRIATE FEDERAL, STATE, AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES.

NOTE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES, AND MISTS AND ARE SUBJECT TO PROPER WASTE DISPOSAL AS ABOVE.

14.0 TRANSPORTATION INFORMATION

SODIUM HYDROXIDE SOLUTION
8, UN 1824, PG II

15.0 REGULATORY INFORMATION

SECTION 313 SUPPLIER NOTIFICATION

THIS PRODUCT CONTAINS THE FOLLOWING TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT OF 1986 AND OF 40 CFR 372:

CAS #	CHEMICAL NAME	PERCENT BY WEIGHT
NONE		

16.0 OTHER INFORMATION

CONTACT DIRECTOR OF REGULATORY AFFAIRS, BRENNTAG SOUTHEAST DURING BUSINESS HOURS, EASTERN TIME (919) 596-0681.

This Material Safety Data Sheet conforms to the requirements of ANSI Z400.1.

BRENNTAG SOUTHEAST EXPRESSLY DISCLAIMS ALL EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN.

ALL INFORMATION APPEARING HEREIN IS BASED UPON DATA OBTAINED FROM RECOGNIZED TECHNICAL SOURCES. WHILE THE INFORMATION IS BELIEVED TO BE ACCURATE, BRENNTAG SOUTHEAST MAKES NO REPRESENTATIONS AS TO ITS ACCURACY OF SUFFICIENCY.

CONDITIONS OF USE ARE BEYOND BRENNTAG SOUTHEAST'S CONTROL AND THEREFORE USERS ARE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY ASSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM THE PUBLICATION OR USE OF, OR RELIANCE UPON, INFORMATION CONTAINED HEREIN. THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER PROCESS.

**********END OF MSDS**********

LCS50%

PQ Corporation

MSDS

MATERIAL SAFETY DATA SHEET

Trade Name: **STAR™ Sodium Silicate Solution**
Date Prepared: 06/26/06

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name:	STAR™ Sodium silicate solution
Product description:	A 2.50 weight ratio sodium silicate, 37.1% solution in water
Manufacturer:	PQ Corporation P. O. Box 840 Valley Forge, PA 19482 USA
Telephone:	610-651-4200
In case of emergency call:	610-651-4200
For transportation emergency Call CHEMTREC:	800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical and Common Name	*CAS Registry Number*	*Wt. %*	*OSHA PEL*	*ACGIH TLV*
Water	7732-18-5	62.9%	Not Established	Not Established
Silicic acid, sodium salt; Sodium silicate	1344-09-8	37.1%	Not Established	Not Established

3. HAZARDS IDENTIFICATION

Emergency Overview:	Clear, colorless, odorless, thick liquid. Causes moderate eye, skin, and digestive tract irritation. Spray mist causes irritation to respiratory tract. Due to high pH of product, release into surface water is harmful to aquatic life. Noncombustible. Spills are slippery. Reacts with acids, ammonium salts, reactive metals and some organics.
Eye contact:	Causes moderate irritation to the eyes.
Skin contact:	Causes moderate irritation to the skin.
Inhalation:	Spray mist is irritating to respiratory tract.
Ingestion:	May cause irritation to mouth, esophagus, and stomach.
Chronic hazards:	No known chronic hazards. Not listed by NTP, IARC or OSHA as a carcinogen.
Physical hazards:	Dries to form glass film, which can easily cut skin. Spilled material is very slippery. Can etch glass if not promptly removed.

4. FIRST AID MEASURES

Eye:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin:	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention.

Inhalation:	**Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.**
Ingestion:	**If swallowed, DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.**

5. FIRE FIGHTING MEASURES

Flammable limits:	**This material is noncombustible.**
Extinguishing Media:	**This material is compatible with all extinguishing media.**
Hazards to fire-fighters:	**See Section 3 for information on hazards when this material is present in the area of a fire.**
Fire-fighting equipment:	**The following protective equipment for fire fighters is recommended when this material is present in the area of a fire: chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots.**

6. ACCIDENTAL RELEASE MEASURES

Personal protection:	**Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots. See section 8.**
Environmental Hazards:	**Sinks and mixes with water. High pH of this material is harmful to aquatic life, see Section 12. Only water will evaporate from a spill of this material.**
Small spill cleanup:	**Mop up and neutralize liquid, then discharge to sewer in accordance with federal, state and local regulations or permits.**
Large spill cleanup:	**Keep unnecessary people away; isolate hazard area and deny entry. Do not touch or walk through spilled material. Stop leak if you can do so without risk. Prevent runoff from entering into storm sewers and ditches which lead to natural waterways. Isolate, dike and store discharged material, if possible. Use sand or earth to contain spilled material. If containment is impossible, neutralize contaminated area and flush with large quantities of water.**
CERCLA RQ:	**There is no CERCLA Reportable Quantity for this material. If a spill goes off site, notification of state and local authorities is recommended.**

7. HANDLING AND STORAGE

Handling:	**Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Keep container closed. Promptly clean residue from closures with cloth dampened with water. Promptly clean up spills.**
Storage:	**Keep containers closed. Store in clean steel or plastic containers. Separate from acids, reactive metals, and ammonium salts. Storage temperature 0-95° C. Loading temperature 45-95 ° C. Do not store in aluminum, fiberglass, copper, brass, zinc or galvanized containers.**

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls:	**Use with adequate ventilation. Keep containers closed. Safety shower and eyewash fountain should be within direct access.**
Respiratory protection:	**Use a NIOSH-approved dust and mist respirator where spray mist occurs. Observe OSHA regulations for respirator use (29 C.F.R. §1910.134)**
Skin protection:	**Wear body-covering protective clothing and gloves.**
Eye protection:	**Wear chemical goggles.**

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	**Thick liquid.**
Color:	**Clear and colorless.**
Odor:	**Odorless or musty odor.**
pH:	**Approximately 12.4**
Specific gravity:	**1.41 g/cm^3 (20°C), 42.0° Bé, 11.75 lbs/gal**
Solubility in water:	**Miscible.**

10. STABILITY AND REACTIVITY

Stability:	**This material is stable under all conditions of use and storage.**
Conditions to avoid:	**None.**
Materials to avoid:	**Gels and generates heat when mixed with acid. May react with ammonium salts resulting in evolution of ammonia gas. Flammable hydrogen gas may be produced on contact with aluminum, tin, lead, and zinc.**
Hazardous decomposition products:	**Hydrogen.**

11. TOXICOLOGICAL INFORMATION

Acute Data:	**When tested for eye and skin irritation potential, a similar material caused moderate irritation to the eyes and moderate irritation to the skin. Human experience indicates that skin irritation occurs, particularly, when sodium silicates get on clothes at the collar, cuffs or other areas where contact and abrasion may occur.** **The acute oral toxicity of this product has not been tested. When sodium silicates were tested on a 100% solids basis, their single dose acute oral LD_{50} in rats ranged from 1500 mg/kg to 3200 mg/kg. The acute oral lethality resulted from nonspecific causes. This product contains approximately 37.1% sodium silicate.**
Subchronic Data:	**In a study of rats fed sodium silicate in drinking water for three months, at 200, 600 and 1800 ppm, changes were reported in the blood chemistry of some animals, but no specific changes to the organs of the animals due to sodium silicate administration were observed in any of the dosage groups. Another study reported adverse effects to the kidneys of dogs fed sodium silicate in their diet at 2.4g/kg/day for 4 weeks, whereas rats fed the same dosage did not develop any treatment-related effects. Decreased**

	numbers of births and survival to weaning was reported for rats fed sodium silicate in their drinking water at 600 and 1200 ppm.
Special Studies:	Sodium silicate was not mutagenic to the bacterium E. Coli when tested in a mutagenicity bioassay. There are no known reports of carcinogenicity of sodium silicates. Frequent ingestion over extended periods of time of gram quantities of silicates is associated with the formation kidney stones and other siliceous urinary calculi in humans. Sodium silicate is not listed by IARC, NTP or OSHA as a carcinogen.

12. ECOLOGICAL INFORMATION

Eco toxicity:	The following data is reported for sodium silicates on a 100% solids basis: A 96 hour median tolerance for fish (Gambusia affnis) of 2320 ppm; a 96 hour median tolerance for water fleas (Daphnia magna) of 247 ppm; a 96 hour median tolerance for snail eggs (Lymnea) of 632 ppm; and a 96 hour median tolerance for Amphipoda of 160 ppm. This product contains approximately 37.1% sodium silicate.
Environmental Fate:	This material is not persistent in aquatic systems, but its high pH when undiluted or unneutralized is acutely harmful to aquatic life. Diluted material rapidly depolymerizes to yield dissolved silica in a form that is indistinguishable from natural dissolved silica. It does not contribute to BOD. This material does not bioaccumulate except in species that use silica as a structural material such as diatoms and siliceous sponges. Where abnormally low natural silica concentrations exist (less than 0.1 ppm), dissolved silica may be a limiting nutrient for diatoms and a few other aquatic algal species. However, the addition of excess dissolved silica over the limiting concentration will not stimulate the growth of diatom populations; their growth rate is independent of silica concentration once the limiting concentration is exceeded. Neither silica nor sodium will appreciably bioconcentrate up the food chain.
Physical/Chemical:	Sinks and mixes with water. Only water will evaporate from this material.

13. DISPOSAL CONSIDERATIONS

Classification:	Disposed material is not a hazardous waste.
Disposal Method:	Dispose in accordance with federal, state and local regulations and permits.

14. TRANSPORT INFORMATION

DOT UN Status:	This material is not regulated hazardous material for transportation.

15. REGULATORY INFORMATION

CERCLA:	**No CERCLA Reportable Quantity has been established for this material.**
SARA TITLE III:	**Not an Extremely Hazardous Substance under §302. Not a Toxic Chemical under §313. Hazard Categories under §§311/312: Acute**
TSCA:	**All ingredients of this material are listed on the TSCA inventory.**
FDA:	**The use of sodium silicate is authorized by FDA as a boiler water additive for the production of steam that will contact food pursuant to 21 CFR §173.310; as a component of zinc-silicon dioxide matrix coatings on food contact surfaces pursuant to 21 CFR §175.390(c); as a GRAS substance when migrating from cotton fabric used in dry food packaging pursuant to 21 CFR §182.70; and as a GRAS substance when migrating to food from paper and paperboard products pursuant to 21 CFR §182.90.**

16. OTHER INFORMATION

Prepared by:	**John G. Blumberg**
Supersedes revision of:	**03/10/05**

SECTION 1. PRODUCT IDENTIFICATION

Trade Name	**77 % - 100 % Sulfuric Acid**
Product Code	None
Manufacturers/Distributors	NorFalco LLC, 6050 Oak Tree Blvd, Suite 190, Independence, OH U.S.A. 44131 NorFalco Sales Inc., 6755 Mississauga Road, Suite 304, Mississauga, Ontario L5N 2Y7
Information Contact	André Auger, Administration Assistant
Product Information	1-905-542-6901 (Mississauga)
Phone Number (Transportation Emergency)	Canada 1-877-ERP-ACID (377-2243)
Phone Number (Transportation Emergency)	U.S.A. 1-800-424-9300 CHEMTREC
Phone Number (Medical Emergency)	**1-418-656-8090**
Synonyms	Dihydrogen Sulfate ; Oil of Vitriol ; Vitriol Brown Oil Acide sulfurique (French)
Name / Chemical Formula	Sulfuric Acid / H_2SO_4
Chemical Family	Acid
Utilization	Chemical industries
Manufacturers	CEZinc on behalf of Noranda Income Limited Partnership, Salaberry-de-Valleyfield (Quebec) Canada J6S 4W2 Xstrata Copper, Horne Smelter, Rouyn-Noranda (Quebec) J9X 5B6 Xstrata Zinc, Brunswick Smelting Division, Belledune, New Brunswick E0B 1G0 Xstrata Copper, Kidd Creek Division, Timmins, Ontario P4N 7K1 Xstrata Nickel, Sudbury Operations, Falconbridge, Ontario P0M 1S0

SECTION 2. HAZARDS IDENTIFICATION

WHMIS (Canada) CLASS D-1A : Very toxic material causing immediate and serious effects
CLASS E : Corrosive material

Labeling (EEC) C Corrosive

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS #	Percentage (%)	# CE	R Phrases[1]
Sulfuric (Acid)	7664-93-9	77 % to 100 %	231-639-5	R35
60 Deg Technical		77.7		
66 Deg Technical		93.2		
1.835 Electrolyte		93.2		
98 % Technical		98		
99 % Technical		99		
100 % Technical		100		
Water	7732-18-5	0-22		

Note 1 : See section 15 for the complete wording of risk phrases.

SECTION 4. FIRST-AID MEASURES

Eye Contact Remove contact lenses if present. Immediately flush eyes with plenty of water, holding eyelids open for at least 15 minutes. Consult a physician. Possibility of conjonctivitis, severe irritation, severe burns, permanent eye damage.

Skin Contact Remove contaminated clothing and shoes as quickly as possible protecting your hands and body. Place under a deluge shower for 15 minutes. Flush exposed skin gently and thoroughly with running water (Pay particular attention to : Folds, crevices, creases, groin). Call a physician if irritation persists. May irritate skin, cause burns (Highly corrosive) and possibility of some scarring.

Wash contaminated clothing before reusing. While the patient is being transported to a medical facility, continue the application of cold, wet compresses. If medical treatment must be delayed, repeat the flushing with cold water or soak the affected area with cold water to help remove the last traces of sulfuric acid. *Creams or ointments **SHOULD NOT** be applied before or during the washing phase of treatment.*

Inhalation Take precautions to avoid secondary contamination by residual acids. Remove the person to fresh air. If not breathing, give artificial respiration. Difficult breathing : Give oxygen. Get immediate medical attention. Possibility of damage to the upper respiratory tract and lung tissues. Maintain observation of the patient for delayed onset of pulmonary oedema. May cause irritation to the upper respiratory tract : Coughing, sore throat, shortness of breath.

Ingestion **DO NOT** INDUCE VOMITING. Conscious and alert person : Rinse mouth with water and give ½ to 1 cup of water or milk to dilute material. **Spontaneous vomiting :** Keep head below hips to prevent aspiration ; Rinse mouth and give ½ to 1 cup of water or milk. **UNCONSCIOUS** person : **DO NOT** induce vomiting or give any liquid. **Immediately** obtain medical attention.

Notes to Physicians

Continued washing of the affected area with cold or iced water will be helpful in removing the last traces of sulfuric acid. Creams or ointments should not be applied before or during the washing phase of the treatment.

SECTION 5. FIRE-FIGHTING MEASURES

Flash Point	Not available
Flammable Limits	Not available
Auto-Ignition Temperature	Not available
Products of Combustion	Releases of sulfur dioxide at extremely high temperatures.
Fire Hazard	Not flammable
Explosion Hazard	Reacts with most metals, especially when dilute : Hydrogen gas release (**Extremely** flammable, explosive). Risk of explosion when acid combined with water organic materials or base solutions in enclosed spaces (Vaccum trucks, tanks). Follow appropriate *National Fire Protection Association* (NFPA) codes.
Extinguishing media	Use media appropriate for surrounding material. Use water spray to cool containers exposed to fire ; **DO NOT** get water inside containers.
Protective equipment	Evacuate personnel to a safe area. Keep personnel removed and upwind of fire. Generates heat upon addition of water, with possibility of spattering. Wear full protective clothing. Runoff from fire control may cause pollution. Neutralize run-off with lime, soda ash, etc., to prevent corrosion of metals and formation of hydrogen gas. Wear self-contained breathing apparatus if fumes or mists are present.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill	Review **Fire and Explosion Hazards** and **Safety Precautions** before proceeding with clean up. Stop flow if possible. Soak up small spills with dry sand, clay or diatomaceous earth.
Methods	Dike large spills, and cautiously dilute and neutralize with lime or soda ash, and transfer to waste water treatment system. Prevent liquid from entering sewers, waterways, or low areas. If this product is spilled and not recovered, or is recovered as a waste for treatment or disposal, the Reportable Quantity (U.S. DOT) is 1 000 lbs (Based on the sulfuric acid content of the solution spilled). Comply with Federal, State, and local regulations on reporting releases.
Protective equipment	Review Fire Fighting Measures and Handling (Personnel Protection) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

SECTION 7. HANDLING AND STORAGE

Handling	Do not get in eyes, on skin, or on clothing. Avoid breathing vapours or mist. Wear approved respirators if adequate ventilation cannot be provided. Wash thoroughly after handling. Ingestion or inhalation : Seek medical advice **immediately** and provide medical personnel with a copy of this MSDS.
Conditions for storage	Sulfuric acid must be stored in containers or tanks that have been specially designed for use with sulfuric acid. **DO NOT** add water or other products to contents in containers as violent reactions will result with resulting high heat, pressure and/or generation of hazardous acid mists. Keep containers away from heat, sparks, and flame. All closed containers must be safely vented before each opening. For more information on sulfuric acid tanks, truck tanks and tank cars including safe unloading information go to **www.norfalco.com** .

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Name	CAS #	ACGIH (U.S.A.) 2007 TLV-TWA (mg/m³)	OSHA (U.S.A.) PEL - TWA (mg/m³)
Sulfuric (Acid)	7664-93-9	0.2 (thoracic fr.)	1
60 Deg Technical		0.2 (thoracic fr.)	1
66 Deg Technical		0.2 (thoracic fr.)	1
1.835 Electrolyte		0.2 (thoracic fr.)	1
98 % Technical		0.2 (thoracic fr.)	1
99 % Technical		0.2 (thoracic fr.)	1
100 % Technical		0.2 (thoracic fr.)	1
Water	7732-18-5	Not established	Not established

ACGIH : American Conference of Governmental Industrial Hygienists. OSHA : Occupational Safety and Health Administration.

Note : **Sulfuric (Acid) :** Exposure limits may be different in other jurisdictions. NIOSH REL-TWA (≤10 hours) : 1 mg/m³ ; IDLH : 15 mg/m³. *Consult local authorities for acceptable exposure limits.*

Engineering Controls Good general ventilation should be provided to keep vapour and mist concentrations below the exposure limits.

Individual protection Chemical splash goggles ; Full-length face shield/chemical splash goggles combination ; Acid-proof gauntlet gloves, apron, and boots ; Long sleeve wool, acrylic, or polyester clothing ; Acid proof suit and hood ; Appropriate NIOSH respiratory protection.

In case of emergency or where there is a strong possibility of considerable exposure, wear a complete acid suit with hood, boots, and gloves. If acid vapour or mist are present and exposure limits may be exceeded, wear appropriate NIOSH respiratory protection.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance	Liquid (Oily ; Clear to turbid)	**Odour**	Odourless
Molecular Weight	98.08	**Colour**	Colourless to light grey
pH (1% soln/water)	< 1	**Volatility**	< 1 (Butyl Acetate = 1.0)
Boiling Point	193°C to 327 °C (379°F to 621°F) @ 760 mm Hg	**Vapour Density**	3.4
Melting Point	-35°C to 11°C (-31°F to 52°F)	**Dispersion**	Yes (Water)
Vapour Pressure	< 0.3 mm Hg @ 25°C (77 °F) < 0.6 mm Hg @ 38°C (100 °F)	**Solubility**	Yes (Water)

GRADE	Boiling Point		Freezing Point		Specific Gravity
	DEG °C	DEG °F	DEG °C	DEG °F	
60 DEG TECHNICAL	193	380	- 12	10	1.706
66 DEG TECHNICAL	279	535	- 35	- 31	1.835
1.835 ELECTROLYTE	279	535	- 35	- 31	1.835
98 % TECHNICAL	327	621	- 2	29	1.844
99 % TECHNICAL	310	590	4	40	1.842
100 % TECHNICAL	274	526	11	51	1.839

SECTION 10. STABILITY AND REACTIVITY

Stability Yes (Under normal conditions of ambiant temperature)

Reactivity Reacts violently with water and organic materials with evolution of heat.

Conditions to avoid Heat : Possibility of decomposition. Release of dangerous gases (Sulfur oxides SO_2, SO_3)

Polymerization Polymerization will not occur.

Incompatibilities Vigorous reactions with : Water; alkaline solutions ; Metals, metal powder ; Carbides ; Chlorates ; Fulminates ; nitrates ; Picrates ; Strong oxidizing, reducing, or combustible organic materials. Hazardous gases are evolved on contact with chemicals such as cyanides, sulfides, and carbides.

Corrosivity Yes

SECTION 11. TOXICOLOGICAL INFORMATION

Routes of Entry Ingestion. Inhalation. Skin and eye contacts.

Carcinogenicity **Strong inorganic acid mists containing sulfuric acid (Occupational exposures) :** PROVEN (Human, Group 1, IARC) ; SUSPECTED (Human, Group A2, ACGIH) ; Group X (NTP) ; Classification not applicable to sulfuric acid and sulfuric acid solutions.

Mutagenicity Not applicable.

Teratogenicity Not applicable.

Acute toxicity ORAL (LD50) : 2 140 mg/kg (Rat) ; INHALATION (LC50, 2 hours) : 510 mg/m^3 (Rat) ; 320 mg/m^3 (Mouse). (RTECS).

Acute Effects May be **fatal** if inhaled or ingested in large quantity. Liquids or acid mists : May produce tissue damage : Mucous membranes (Eyes, mouth, respiratory tract). **Extremely** dangerous by eyes and skin contact **(Corrosive)**. Severe irritant for eyes : Inflammation (Redness, watering, itching). Very dangerous in case of inhalation (Mists) at high concentrations : May produce severe irritation of respiratory tract (Coughing, shortness of breath, choking).

Chronic Effects Overexposure to strong inorganic mists containing sulfuric acid : Possibility of laryngeal cancer (HSBD, IARC). Target organs for acute and chronic overexposure (NIOSH 90-117) : Respiratory system, eyes, skin, teeth.

Acid mists : Possibility of irritation of the nose and throat with sneezing, sore throat or runny nose. Headache, nausea and weakness. Gross overexposure : Possibility of irritation of nose, throat, and lungs with cough, difficulty breathing or shortness of breath. Pulmonary edema with cough, wheezing, abnormal lung sounds, possibly progressing to severe shortness of breath and bluish discoloration of the skin. Symptoms may be delayed. Repeated or prolonged exposure to mists may cause : Corrosion of teeth.

Contact (Skin) : Possibility of corrosion, burns or ulcers. Contact with a 1 % solution : Possibility of slight irritation with itching, redness or swelling. Repeated or prolonged exposure (Mist) : Possibility of irritation with itching, burning, redness, swelling or rash.

Contact (Eye) : Possibility of corrosion or ulceration (Blindness may result). Repeated or prolonged exposure (Mist) : Possibility of eye irritation with tearing, pain or blurred vision.

Ingestion : Immediate effects of overexposure : Burns of the mouth, throat, esophagus and stomach, with severe pain, bleeding, vomiting, diarrhea and collapse of blood pressure. Damage may appear days after exposure.

Toxicity

Persons with the following pre-existing conditions warrant particular attention :
Sulfuric (Acid) : Laryngeal irritation.

Eating, drinking and smoking must be prohibited in areas where this material is handled and processed. Wash hands and face before eating, drinking and smoking.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic toxicity : Slightly to moderately toxic.
Bluegill Sunfish (LC50 ; 48 hours) : 49 mg/l (Tap water, 20 °C, conditions of bioessay not specified). (HSBD).
Flounder (LC50 ; 48 hours) : 100-330 mg/l (Aerated water, conditions of bioessay not specified). (HSBD).

Toxicity to Animals

EYE : Concentrated compound is corrosive. 10 % solution : Moderate eye irritant.
SKIN : Concentrated compound is corrosive. 10 % solution : Slight skin irritant.
Single and repeated exposure : Irritation of the respiratory tract ; Corrosion of the respiratory tract ; Lung damage ; Labored breathing ; Altered respiratory rate ; Pulmonary oedema. Repeated exposure : Altered red blood cell count.

Mobility (Soil) Easy soil seeping under rain action

Persistence and degradability Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants.

Bioaccumulation Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants whitout bioaccumulation.

Biodegradation Products Not available

Biodegradation Products (Toxicity) Not applicable

Remarks on Environment Due to the product's composition, particular attention must be taken for transportation and storage. Protect from rain because the run-off water will become acidic and may be harmful to flora and fauna.

BOD5 and COD Not available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Cleaned-up material may be an hazardous waste on *Resource Conservation and Recovery Act* (RCRA) on disposal due to the corrosivity characteristic. **DO NOT** flush to surface water or sanitary sewer system. Comply with Federal, State, and local regulations. If approved, neutralize and transfer to waste treatment system.

SECTION 14. TRANSPORT INFORMATION

TDG (Canada) CLASS 8 Corrosives

PIN UN1830 SULFURIC ACID PG II

Special Provisions (Transport) None

DOT (U.S.A.)/IMO (Maritime)

Proper Shipping Name	SULFURIC ACID
Hazard Class	8
UN N°	1830
DOT/IMO Label	CORROSIVE
Packing Group	II
Reportable Quantity	1000 lbs (454 kg)
Shipping Containers	Tank Cars, Tank Trucks, Vessel

SECTION 15 REGULATORY INFORMATION

Labeling (EEC)

EU (Directive 67/548/EEC) :
Sulfuric (Acid) : C Corrosive (Pictogram)
Annex I Index number : 016-020-00-8 ; EU Consolidated Inventories : EC Number 231-639-5
C ≥ 15 % C ; R35 ; S2, 26, 30, 45.

Risk Phrases (EEC)

R35- Causes severe burns
R8- Contact with combustible material may cause fire

Safety Phrases (EEC)

S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S30- Nerver add water to this product
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

CEPA DSL (CANADA)

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) : On the Domestic Substances List (DSL) ; Acceptable for use under the provisions of CEPA.

Regulations (U.S.A.) CERCLA Section 103 Hazardous substances (40 CFR 302.4) ; SARA Section 302 Extremely Hazardous Substances (40 CFR 355) : Yes ; SARA Section 313, Toxic Chemicals (40 CFR 372.65) ; US: TSCA Inventory : Listed :
Sulfuric (Acid) (Final RQ) : 1 000 pounds (454 kg)

Sulfuric Acid is subject to reporting requirements of Section 313, *Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA)*, 40 CFR Part 372.

Certain companies must report emissions of Sulfuric Acid as required under *The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)*, 40 CFR Part 302

For more information call the *SARA Hotline* 800-424-9346.

Strong Inorganic Acid Mists Containing Sulfuric Acid : Chemical listed effective March 14, 2003 to the *State of California, Proposal 65.*

Sulfuric Acid is a Class B Drug Precursor under *Health Canada's Controlled Drugs and Substances Act* and *Precursor Control Regulations*.

U.S. FDA Food Bioterrorism Regulations : These regulations apply to Sulfuric Acid when being distributed, stored or used for Food or Food Processing.

Classifications HCS (U.S.A.) Dangerous may cause cancer
Corrosive liquid

NFPA (National Fire Protection Association) (U.S.A.)

Fire Hazard	0	Reactivity	2	Health	3	Special Hazard	ACID

NPCA- HMIS Rating

Fire Hazard	0	Reactivity	2	Health	3

SECTION 16. OTHER INFORMATION

References

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- CCOHS (2007) - Canadian Centre for Occupational Health and Safety - http://www.ccohs.ca/
- CSST (2007) - Commission de la Santé et de la Sécurité du Travail (Québec). Service du répertoire toxicologique - http://www.reptox.csst.qc.ca/
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- Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition
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- RTECS (2007). Registry of Toxic Effects of Chemical Substances, NIOSH, CDC
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Glossary

CSST	: Commission de la Santé et de la Sécurité du Travail (Québec).
HSDB	: Hazardous Substances Data Bank.
IARC	: International Agency for Research on Cancer.
NIOSH	: National Institute of Occupational Safety and Health.
NTP	: U.S. National Toxicology Program.
RTECS	: Registry of Toxic Effects of Chemical Substances

Note

For further information, see NorFalco LLC Sulfuric Acid « Storage and Handling Bulletin ».

Because of its corrosive characteristics and inherent hazards, Sulfuric Acid should not be used in sewer or drain cleaners or any similar application; regardless of whether they are formulated for residential, commercial or industrial use. NorFalco will not knowingly sell sulfuric acid to individuals or companies who repackage the product for sale as sewer or drain cleaners, or any other similar use.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Written by : Groupe STEM Consultants / NorFalco Sales Inc.
Complete revision : 2008-01-24 **Partial review :** None **Previous complete revision :** 2007-01-24

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Notice to Reader

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. NorFalco Sales Inc.extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This material safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations, therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

SECTION 1. IDENTIFICATION

Product identifier
Trade name : SURFLOC 940

Recommended use of the chemical and restrictions on use
Use of the Substance/Mixture : Industrial chemical

Details of the supplier of the safety data sheet	**Emergency telephone number**
Surpass Chemical 1254 Broadway Albany, NY 12204 518-434-8101 customerservice@surpasschemical.com	518-434-8101 Surpass (business hours) 1 800-424-9300 Chemtrec (24/7)

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Skin irritation : Category 2

Eye irritation : Category 2A

Specific target organ toxicity - single exposure : Category 3 (Central nervous system)

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : H315 Causes skin irritation.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.

Precautionary statements : **Prevention:**
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.

P280 Wear eye protection/ face protection.
P280 Wear protective gloves.

Response:

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

Static Accumulating liquid

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Classification	Concentration (%)
ALIPHATIC HYDROCARBON	Trade Secret	Flam. Liq. 4; H227 STOT SE 3; H336	>= 20 - < 30
ALCOHOL ALKOXYLATES	Trade Secret	Acute Tox. 4; H302 Eye Dam. 1; H318	>= 1.5 - < 5

Trade Secret Composition - conceal identity + concentration

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Call a POISON CENTRE or doctor/physician if exposed or you feel unwell.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : Move to fresh air.

If unconscious, place in recovery position and seek medical advice.
Consult a physician after significant exposure.

In case of skin contact	:	Remove contaminated clothing. If irritation develops, get medical attention. If on skin, rinse well with water. Wash contaminated clothing before re-use.
In case of eye contact	:	Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye.
If swallowed	:	Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.
Most important symptoms and effects, both acute and delayed	:	Inhalation of high concentrations of this material, as could occur in enclosed spaces or during deliberate abuse, may be associated with cardiac arrhythmias. Sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to this material. This material is an aspiration hazard. Potential danger from aspiration must be weighed against possible oral toxicity when deciding whether to induce vomiting. Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea) irritation (nose, throat, airways) Lung irritation confusion irregular heartbeat Convulsions Causes skin irritation. Causes serious eye irritation. May cause drowsiness or dizziness.
Notes to physician	:	No hazards which require special first aid measures.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Water spray Foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during firefighting	:	Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous combustion products	:	carbon dioxide and carbon monoxide Nitrogen oxides (NOx) Hydrocarbons
Specific extinguishing methods	:	Product is compatible with standard fire-fighting agents.
Further information	:	Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Comply with all applicable federal, state, and local regulations.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Advice on safe handling	:	Avoid formation of aerosol. Provide sufficient air exchange and/or exhaust in work rooms. Do not breathe vapours/dust. Do not smoke. Container hazardous when empty. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. Smoking, eating and drinking should be prohibited in the application area. For personal protection see section 8. Dispose of rinse water in accordance with local and national regulations.
Conditions for safe storage	:	Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Observe label precautions.
Electrical installations / working materials must comply with the technological safety standards.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
ALIPHATIC HYDROCARBON	Trade Secret	TWA (Mist)	5 mg/m3	OSHA Z-1
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
		TWA (Mist)	5 mg/m3	OSHA P0
		TWA (Mist)	5 mg/m3	NIOSH REL
		ST (Mist)	10 mg/m3	NIOSH REL

Trade Secret Composition - conceal identity + concentration

Engineering measures : Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects.

Personal protective equipment

Respiratory protection : In the case of vapour formation use a respirator with an approved filter.

A NIOSH-approved air-purifying respirator with an appropriate cartridge and/or filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits (if applicable) or if overexposure has otherwise been determined. Protection provided by air-purifying respirators is limited. Use a positive pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are not known or any other circumstances where an air-purifying respirator may not provide adequate protection.

Hand protection

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Wear chemical splash goggles when there is the potential for exposure of the eyes to liquid, vapor or mist.

Skin and body protection : Wear as appropriate:
Impervious clothing
Safety shoes

Choose body protection according to the amount and concentration of the dangerous substance at the work place. Discard gloves that show tears, pinholes, or signs of wear. Wear resistant gloves (consult your safety equipment supplier).

Hygiene measures : Wash hands before breaks and at the end of workday.
When using do not eat or drink.
When using do not smoke.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	viscous
Colour	:	white
Odour	:	hydrocarbon-like
Odour Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Boiling point/boiling range	:	No data available
Flash point	:	> 101 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Self-ignition	:	No data available
Upper explosion limit	:	7 %(V) GLP: Calculated Explosive Limit
Lower explosion limit	:	0.6 %(V) GLP: Calculated Explosive Limit
Vapour pressure	:	19.3 hPa (20 °C) Method: ASTM D 2879-86
Relative vapour density	:	No data available
Relative density	:	No data available
Density	:	Approximate 1.03 g/cm3
Solubility(ies)		
Water solubility	:	soluble
Solubility in other solvents	:	No data available

Partition coefficient: n-octanol/water	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	> 20.5 mm2/s (40 °C)
Oxidizing properties	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No decomposition if stored and applied as directed.
Chemical stability	:	Stable under recommended storage conditions.
Possibility of hazardous reactions	:	Product will not undergo hazardous polymerization.
Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Strong oxidizing agents strong reducing agents

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
Skin contact
Eye Contact
Ingestion

Acute toxicity

Not classified based on available information.

Components:

ALIPHATIC HYDROCARBON:

Acute oral toxicity	:	LD 50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC 50 (Rat, male and female): > 5.28 mg/l Exposure time: 4 h Test atmosphere: vapour Method: OECD Test Guideline 403 Assessment: No adverse effect has been observed in acute inhalation toxicity tests.
Acute dermal toxicity	:	LD 50 (Rabbit): > 2,000 mg/kg Assessment: No adverse effect has been observed in acute dermal toxicity tests.

ALCOHOL ALKOXYLATES:
Acute oral toxicity : LD 50 (Rat): 1,380 mg/kg

Skin corrosion/irritation
Causes skin irritation.

Product:
Remarks: May cause skin irritation and/or dermatitis.

Result: Repeated exposure may cause skin dryness or cracking

Components:

ALIPHATIC HYDROCARBON:
Result: Mildly irritating to skin

ALCOHOL ALKOXYLATES:
Result: Not irritating to skin

Serious eye damage/eye irritation
Causes serious eye irritation.

Product:
Remarks: **Vapours may cause irritation to the eyes, respiratory system and the skin. Causes serious eye irritation.**

Components:

ALIPHATIC HYDROCARBON:
Result: Mildly irritating to eyes

ALCOHOL ALKOXYLATES:
Result: Risk of serious damage to eyes.

Respiratory or skin sensitisation

Skin sensitisation
Not classified based on available information.

Respiratory sensitisation
Not classified based on available information.

Germ cell mutagenicity
Not classified based on available information.

Carcinogenicity
Not classified based on available information.

Reproductive toxicity

Not classified based on available information.

STOT - single exposure

May cause drowsiness or dizziness.

Components:

ALIPHATIC HYDROCARBON:

Assessment: May cause drowsiness or dizziness.

STOT - repeated exposure

Not classified based on available information.

Aspiration toxicity

Not classified based on available information.

Product:

No aspiration toxicity classification

Further information

Product:

Remarks: **Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.**
Concentrations substantially above the TLV value may cause narcotic effects.
Solvents may degrease the skin.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish	:	LC50 (Cyprinodon variegatus (sheepshead minnow)): > 100 mg/l Exposure time: 96 h Method: EPA-821-R-02-012 GLP: no LC 50 (Pimephales promelas (fathead minnow)): 26.5 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Test conducted using environmentally representative water.
Toxicity to daphnia and other aquatic invertebrates	:	EC 50 (Water flea (Ceriodaphnia dubia)): 5.66 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: Test conducted using environmentally representative water. EC50 (Mysidopsis bahia (opossum shrimp)): 1.15 mg/l

Exposure time: 48 h
Method: EPA-821-R-02-012
GLP: no

Ecotoxicology Assessment

Acute aquatic toxicity : Acute aquatic toxicity Category 2; Toxic to aquatic life.

Chronic aquatic toxicity : Chronic aquatic toxicity Category 2; Toxic to aquatic life with long lasting effects.

Components:

ALIPHATIC HYDROCARBON:

Ecotoxicology Assessment

Acute aquatic toxicity : No toxicity at the limit of solubility

Chronic aquatic toxicity : No toxicity at the limit of solubility

ALCOHOL ALKOXYLATES:

Toxicity to fish : LC50 (Fish): > 1 - 10 mg/l
Exposure time: 96 h
Test Type: static test

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia (water flea)): > 1 - 10 mg/l
Exposure time: 48 h
Test Type: static test

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : EC50 (Daphnia (water flea)): 0.17 mg/l
Exposure time: 21 d

Ecotoxicology Assessment

Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

Persistence and degradability

Components:

ALCOHOL ALKOXYLATES:

Biodegradability : Result: Readily biodegradable.

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Additional ecological : **An environmental hazard cannot be excluded in the event**

information **of unprofessional handling or disposal.**
Toxic to aquatic life with long lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : The product should not be allowed to enter drains, water courses or the soil.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Send to a licensed waste management company.

Dispose of in accordance with all applicable local, state and federal regulations.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Empty containers should be taken to an approved waste handling site for recycling or disposal.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International transport regulations

REGULATION

ID NUMBER	PROPER SHIPPING NAME	*HAZARD CLASS	SUBSIDIARY HAZARDS	PACKING GROUP	MARINE POLLUTANT / LTD. QTY.

MEXICAN REGULATION FOR THE LAND TRANSPORT OF HAZARDOUS MATERIALS AND WASTES

Not dangerous goods

INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER

Not dangerous goods

INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO

Not dangerous goods

INTERNATIONAL MARITIME DANGEROUS GOODS

Not dangerous goods

TRANSPORT CANADA - RAIL

Not dangerous goods

TRANSPORT CANADA - ROAD

Not dangerous goods	MARINE POLLUTANT:(HYDROTREATED PETROLEUM DISTILLATES)

U.S. DOT - INLAND WATERWAYS

Not dangerous goods

U.S. DOT - RAIL

Not dangerous goods

U.S. DOT - ROAD

Not dangerous goods

***ORM = ORM-D, CBL = COMBUSTIBLE LIQUID**

Marine pollutant		yes

Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Hazard not otherwise classified (physical hazards)
Skin corrosion or irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Prop. 65

Proposition 65 warnings are not required for this product based on the results of a risk assessment.

The components of this product are reported in the following inventories:

TSCA : On TSCA Inventory

DSL	:	This product contains one or several components that are not on the Canadian DSL nor NDSL.
AICS	:	On the inventory, or in compliance with the inventory
ENCS	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

Further information
Revision Date: 12/29/2017

Full text of H-Statements

H227	:	Combustible liquid.
H302	:	Harmful if swallowed.
H318	:	Causes serious eye damage.
H336	:	May cause drowsiness or dizziness.

Full text of other abbreviations

Acute Tox.	:	Acute toxicity
Eye Dam.	:	Serious eye damage
Flam. Liq.	:	Flammable liquids
STOT SE	:	Specific target organ toxicity - single exposure

Further information

Other information	:	The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This MSDS has been prepared by the Surpass Chemical Company, Inc.

Sources of key data used to compile the Safety Data Sheet
Key literature references and sources of data
SOLENIS Internal data
SOLENIS internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS -

Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

US / EN

Univar
3075 Highland Pkwy STE 200
Downers Grove, IL 60515
425-889-3400

SAFETY DATA SHEET

1. Identification

Product identifier: - CAUSTIC SODA 50%

Other means of identification

Synonyms:	Sodium Hydroxide
CAS NUMBERS:	1310-73-2
SDS number:	000100000088

Recommended use and restriction on use

Recommended use: Reserved for industrial and professional use.

Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor Information

Univar

3075 Highland Pkwy STE 200

Downers Grove, IL 60515

425-889-3400

Emergency telephone number:For emergency assistance Involving chemicals

call CHEMTREC day or night at: 1-800-424-9300. CHEMTREC INTERNATIONAL Tel# 703-527-3887

2. Hazard(s) identification

Hazard Classification

Health Hazards

Acute toxicity (Oral)	Category 4
Skin Corrosion/Irritation	Category 1A
Serious Eye Damage/Eye Irritation	Category 1
Environmental Hazards Acute hazards to the aquatic environment	Category 3

Label Elements

Hazard Symbol

Signal Word	Danger
Hazard Statement	Corrosive. Harmful if swallowed. Causes severe skin burns and eye damage.
Precautionary Statements	
Prevention	Do not breathe dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Do not eat, drink or smoke when using this product.
Response	IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. IF SWALLOWED: Call a POISON CENTER/doctor/ if you feel unwell. Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor. Wash contaminated clothing before reuse.
Storage	Store in a closed container. Keep container tightly closed. Store in a well-ventilated place. Store in a dry place. Store locked up.

Disposal	Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.
Other hazards which do not result in GHS classification	None.

3. Composition/information on ingredients

Substances

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
Sodium hydroxide		1310-73-2	>=48 - <=52%
Water		7732-18-5	>=48 - <=52%
Sodium Chloride		7647-14-5	>=0 - <=5%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Composition Comments: The components are not hazardous or are below required disclosure limits.

4. First-aid measures

General information: CAUTION! First aid personnel must be aware of own risk during rescue!

Ingestion: Do NOT induce vomiting. Never give liquid to an unconscious person. Get medical attention immediately.

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. Perform artificial respiration if breathing has stopped. Get medical attention immediately.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Eye contact: If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.

Most important symptoms/effects, acute and delayed

Symptoms: No data available.

Indication of immediate medical attention and special treatment needed

Treatment: No data available.

5. Fire-fighting measures

General Fire Hazards: Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use: Powder. In case of fire in the surroundings: all extinguishing agents allowed.

Unsuitable extinguishing media: Avoid water in straight hose stream; will scatter and spread fire.

Specific hazards arising from the chemical: Fire or excessive heat may produce hazardous decomposition products. Heat may cause the containers to explode.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: No data available.

Special protective equipment for fire-fighters: Avoid breathing fire vapors. Avoid water in straight hose stream; will scatter and spread fire. Move container from fire area if it can be done without risk.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Keep unauthorized personnel away.

Methods and material for containment and cleaning up: Do not touch or walk through spilled material. Absorb spillage with non-combustible, absorbent material. Dike for later disposal.

7. Handling and storage

Precautions for safe handling: Use personal protective equipment as required. Use only with adequate ventilation. Container must be kept tightly closed.

Conditions for safe storage, including any incompatibilities: Keep container tightly closed. Store in appropriate chemical storage area. Keep in a cool, well-ventilated place. Store in corrosive resistant container with a resistant inner liner.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	type	Exposure Limit Values	Source
Sodium hydroxide	Ceiling	2 mg/m3	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
Sodium hydroxide - Particulate.	ST ESL	20 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	AN ESL	2 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
Sodium hydroxide	Ceiling	2 mg/m3	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)
	Ceiling	2 mg/m3	US. ACGIH Threshold Limit Values (03 2016)
	Ceil_Time	2 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	2 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (03 2016)
	Ceiling	2 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)

Appropriate Engineering Controls Adequate ventilation should be provided so that exposure limits are not exceeded. Eye washes and showers for emergency use.

Individual protection measures, such as personal protective equipment

General information: Use personal protective equipment as required. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned. Practice good housekeeping.

Eye/face protection: Use personal protective equipment as required. Wear goggles/face shield.

Skin Protection

Hand Protection: Chemical resistant gloves.

Other: Chemical resistant clothing

Respiratory Protection:	In case of inadequate ventilation use suitable respirator.
Hygiene measures:	When using do not eat, drink or smoke. Wash thoroughly after handling. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Physical state:	liquid
Form:	liquid
Color:	Colorless
Odor:	Odorless
Odor threshold:	No data available.
pH:	14
Melting point/freezing point:	12 °C 54 °F
Initial boiling point and boiling range:	105 - 140 °C
Flash Point:	No data available.
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	1.333 hPa
Vapor density:	No data available.
Relative density:	1.5258
Solubility(ies)	
Solubility in water:	No data available.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.

Viscosity: No data available.

10. Stability and reactivity

Reactivity: No data available.
Chemical Stability: Material is stable under normal conditions.
Possibility of hazardous reactions: This product may generate hydrogen gas. Keep away from ignition source. Empty container after use should be stored in separate area, and be disposed after degassing completely.
Conditions to avoid: No data available.
Incompatible Materials: Avoid contact with acids and oxidizing substances.
Hazardous Decomposition Products: This product may generate hydrogen gas. Keep away from ignition source. Empty container after use should be stored in separate area, and be disposed after degassing completely.

11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Ingestion: No data available.
Inhalation: No data available.
Skin Contact: No data available.
Eye contact: No data available.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product: ATEmix (): 3,000 mg/kg

Dermal

Product: Not classified for acute toxicity based on available data.

Inhalation

Product: No data available.

Specified substance(s):

Sodium Chloride — LC50 (Rat,): > 42 mg/l 2 = reliable with restrictions LC50 (Rat, 1 h): > 42 mg/l 2 = reliable with restrictions

Repeated dose toxicity

Product: No data available.

Skin Corrosion/Irritation

Product: Causes skin burns.

Serious Eye Damage/Eye Irritation

Product: Causes serious eye damage. Causes severe eye burns.

Respiratory or Skin Sensitization

Product: No data available.

Carcinogenicity

Product: No data available.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro

Product: No data available.

In vivo

Product: No data available.

Reproductive toxicity

Product: No data available.

Specific Target Organ Toxicity - Single Exposure

Product: No data available.

Specific Target Organ Toxicity - Repeated Exposure

Product: No data available.

Aspiration Hazard

Product: No data available.

Other effects: No data available.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish

Product: LC50 (Bluegill Sunfish, 48 h): 1,294.6 mg/l

Aquatic invertebrates

Product: No data available.

Specified substance(s):

Sodium hydroxide — EC50 (Water flea (Ceriodaphnia dubia), 48 h): 34.59 - 47.13 mg/l
Intoxication LC50 (Cockle (Cerastoderma edule), 48 h): 330 - 1,000 mg/l
Mortality LC50 (Common shrimp, sand shrimp (Crangon crangon), 48 h): 33 - 100 mg/l Mortality

Sodium Chloride	LC50 (Tubificid worm, Oligochaete (Limnodrilus hoffmeisteri), 261 h): 5,800 mg/l Mortality LC50 (Water flea (Ceriodaphnia dubia), 7 d): < 330 mg/l Mortality LC50 (Pond snail, pneumonate snail (Physa heterostropha), 24 h): > 5,600 mg/l Mortality EC50 (Tubificid worm (Tubifex tubifex), 24 h): 1,250 mg/l Intoxication LC50 (Pond snail, pneumonate snail (Physa heterostropha), 96 h): 4,100 mg/l Mortality

Chronic hazards to the aquatic environment:

Fish

Product: No data available.

Aquatic Invertebrates

Product: No data available.

Toxicity to Aquatic Plants

Product: No data available.

Persistence and Degradability

Biodegradation

Product: No data available.

BOD/COD Ratio

Product: No data available.

Bioaccumulative Potential

Bioconcentration Factor (BCF)

Product: No data available.

Partition Coefficient n-octanol / water (log Kow)

Product: No data available.

Mobility in Soil: No data available.

Known or predicted distribution to environmental compartments

Sodium hydroxide	No data available.
Water	No data available.
Sodium Chloride	No data available.

Known or predicted distribution to environmental compartments

Sodium hydroxide	No data available.
Sodium Chloride	No data available.

13. Disposal considerations

General information: Dispose of waste and residues in accordance with local authority requirements.

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings

even after container is emptied.

14. Transport information

DOT

UN Number:	UN 1824
UN Proper Shipping Name:	Sodium hydroxide solution
Transport Hazard Class(es)	
Class:	8
Label(s):	8
Packing Group:	II
Marine Pollutant:	Not regulated.
Special precautions for user:	–

IMDG

UN Number:	UN 1824
UN Proper Shipping Name:	SODIUM HYDROXIDE SOLUTION
Transport Hazard Class(es)	
Class:	8
Label(s):	8
EmS No.:	F-A, S-B
Packing Group:	II
Marine Pollutant:	Not regulated.
Special precautions for user:	–

IATA

UN Number:	UN 1824
Proper Shipping Name:	Sodium hydroxide solution
Transport Hazard Class(es):	
Class:	8
Label(s):	8
Packing Group:	II
Environmental Hazards	Not regulated.
Special precautions for user:	–
Other information	
Passenger and cargo aircraft:	Allowed.
Cargo aircraft only:	Allowed.

15. Regulatory information

US Federal RegulationsUS. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Sodium hydroxide Reportable quantity: 1000 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

☐ Acute (Immediate) ☐ Chronic (Delayed) ☐ Fire ☐ Reactive ☐ Pressure Generating

SARA 302 Extremely Hazardous Substance

None present or none present in regulated quantities.

SARA 304 Emergency Release Notification

Chemical Identity	RQ
Sodium hydroxide	1000 lbs.

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity

Chemical Identity	Threshold Planning Quantity

Sodium hydroxide	500 lbs
Water	500 lbs
Sodium Chloride	500 lbs

SARA 313 (TRI Reporting)

None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

Sodium hydroxide Reportable quantity: 1000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65

No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

Sodium hydroxide Listed

US. Massachusetts RTK - Substance List

Sodium hydroxide Listed

US. Pennsylvania RTK - Hazardous Substances

Sodium hydroxide Listed

US. Rhode Island RTK

Sodium hydroxide Listed

Inventory Status:EINECS, ELINCS or NLP:	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.
Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Mexico INSQ:	On or in compliance with the inventory
Ontario Inventory:	Not in compliance with the inventory.
Taiwan Chemical Substance Inventory:	Not in compliance with the inventory.

16.Other information, including date of preparation or last revision

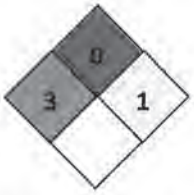
HMIS Hazard ID

Health	*	3
Flammability		0
Physical Hazards		1
PERSONAL PROTECTION		B

B - Safety Glasses & Gloves

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; *Chronic health effect

NFPA Hazard ID



Flammability
Health
Reactivity
Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date:	06/06/2017
Revision Date:	No data available.
Version #:	1.0
Further Information:	No data available.

MATERIAL SAFETY DATA SHEET

IDENTITY:

Vegetable Soap (80/20) Base

Section 1: Suppliers Information:

Manufacture's Name
Original Bradford Soap Works, Inc.
Address:
200 Providence Street
West Warwick, RI 02893

Date Prepared: 5/98

Prepared by: Albert Kendra

Telephone Number For Information:
(401) 821-2141

Telephone Number For Emergency:
(401) 821-2141

Section 2: Hazardous Ingredients/Identity Information:

Hazardous Components:
None

Section 3: Physical/Chemical Characteristics:

Boiling Point: N/A
Vapor Pressure: N/A
Vapor Density: N/A
Solubility in water: Moderately
Appearance: Pellets, Noodles Flakes, Powder

Specific Gravity @ 25°C: 1.04
Melting Point: N/A
Evaporation Rate: N/A

Odor: Characteristic

Section 4: Fire and Explosion Hazard Data:

Flash Point: N/A
Extinguishing Media: Carbon Dioxide, Dry Chemical, Water
Special Fire Fighting Procedures: None
Unusual Fire and Explosion Hazards: None

Section 5: Reactivity Data:

Stability: Stable **Conditions to avoid:** None
Incompatibility: None
Hazardous Decomposition of By-products: None
Hazardous Polymerization: Will not occur

MATERIAL SAFETY DATA SHEET

Section 6: Health Hazard Data:

Routes of Entry: Skin and eye contact, oral ingestion
Health Hazards: Acute - Mild eye irritant
Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No
Signs and symptoms of exposure: Irritation of eyes may cause burning with tearing. Oral ingestion may result in mild gastrointestinal irritation with nausea, vomiting or diarrhea.
Medical Conditions Generally Aggravated by Exposure: Use on dry skin may aggravate the existing condition.
Emergency First Aid Procedures:
Inhalation: Remove to fresh air immediately, contact physician as needed.
Eye contact: Flush eyes with water, contact physician as needed.
Skin contact: Rinse off with water, contact physician as needed.
Ingestion: Dilute with fluids and treat symptomatically, contact physician immediately

Section 7:Precuations for Sale Handling and Use:

Steps to be taken in Case Material is Release or Spilled: Sweep up and dispose using waste disposal method described below.
Waste Disposal Method: Small quantities can be flushed down the sewer with excess water. Large quantities should be sweep up and disposed in an approved landfill.
Precautions to be taken in Handling and Storage: Avoid storing where moisture contacts container.
Other precautions: Always practice good hygiene, wash hands after contact.

Section 8: Control Measures:

Respiratory Protection: Use dust type filter if needed.
Ventilation: Local Exhaust: Not required **Special:** N/A
Mechanical (general): Acceptable **Other:** N/A
Protective Gloves: Not required **Eye Protection:** Safety glasses
Other Protective Clothing or Equipment: None required
Work/Hygienic Practices: Always practice good hygiene, wash hands after contact.

DISCLAIMER:

The information in this MSDS was obtained from current and reliable sources. This data is provided without any warranty, expressed or implied, regarding its correctness or accuracy. It is the user's responsibility to determine safe conditions for the use of this product and to assume liability for loss, injury, or expense resulting from the misuse of this product.

SAFETY DATA SHEET

BARCLAY

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: **VOLAMINE RL-202**

Product Use: Steam Line Treatment

BARCLAY WATER MANAGEMENT, INC.
55 Chapel Street
Newton, MA 02458
Telephone: 617-926-3400

Emergency Phone Number
CHEMTREC
1-800-424-9300

2. HAZARDS IDENTIFICATION

GHS Ratings:

Oral Toxicity	Acute Tox. 4	Oral>300+<=2000mg/kg
Dermal Toxicity	Acute Tox. 4	Dermal>1000+<=2000mg/kg
Inhalation Toxicity	Acute Tox. 4	Gases>2500+<=5000ppm, Vapors>10+<=20mg/l, Dusts&mists>1+<=5mg/l
Skin corrosive	1B	Destruction of dermal tissue: Exposure < 1 hour Observation < 14 days, visible necrosis in at least one animal
Eye corrosive	1	Serious eye damage: Irreversible damage 21 days after exposure, Draize score: Corneal opacity >= 3, Iritis > 1.5

GHS Hazards

H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H332	Harmful if inhaled.

GHS Precautions

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P310	Immediately call a POISON CENTER or doctor/physician.
P321	Specific treatment (see first aid instructions on SDS)
P363	Wash contaminated clothing before reuse.
P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
P303+P361+P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P305+P351+P338	IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing
P405	Store locked up.
P501	Dispose of contents/container to an approved waste disposal plant.

Signal Word: **Danger**

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name / CAS No.	OSHA Exposure Limits	ACGIH Exposure Limits	Other Exposure Limits
2-(Dimethylamino)ethanol 108-01-0 10 to 20%			

4. FIRST AID MEASURES

Inhalation:
Remove victim to fresh air and keep a rest in a positioin comfortable for breathing. Get medical attention if any discomfort continues.
Eye Contact:
Rinse the eye with water immediately. Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyes wide apart. Get medical attention promptly if symptoms occur after washing.
Skin Contact:
Immediately remove contaminated clothing. Rinse immediately with plenty of water. Continue to rinse for at least 15 minutes. Get medical attention if irritation persists after washing.
Ingestion:
NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs. Rinse mouth thoroughly. Get medical attention if any discomfort continues.
Notes to Physician:
Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flash Point: N/A
LEL: UEL:
Flammability of the Product:
Product does not susttain combustion.
Extinguishing Media:
Foam, Dry powder, Water spray, Carbon dioxide (CO2)
Further information:
Use water spray to cool unpened containers.
Specific hazards during fire fighting:
Thermal decomposition can lead to release of toxic gases and vapours.
Carbon oxides and nitrogen oxides.
Fire Fighting Methods:
Standard procedure for chemical fires. Cool containers / tanks with water spray.
Special protective equipment for fire-fighters:
In the event of fire, wear self-contained breathing apparatus. Splashproof protective suit.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Avoid contact with skin and eyes. Wear personal protective equipment (see section 8).
Environmental precautions:
Should not be released into the environment. Stop the leakage if possible.
Methods for cleaning up:
In case of large spillage, contain by damming up. Collect by pump. Take up mechanically and collect into suitable containers for disposal. Must be disposed of in accordance with local and national regulations. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). After cleaning, flush away traces

with water.

7. HANDLING AND STORAGE

Handling:
Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation. Wear appropriate personal protective equipment when handling this product. Do not get in eyes or on skin. Avoid breathing vapors, mist or dust. Rinse immediately contaminated containers, equipment and tools with water.
Storage:
Store at room temperature in the original container. Keep tightly closed in a dry and well ventilated place. Avoid freezing and extreme heat. Protect from heat and sources of ignition.
Materials for packaging:
Suitable material: original container, plastic (PE, PP, PVC), Stainless steel.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Chemical Name / CAS No.	OSHA Exposure Limits	ACGIH Exposure Limits	Other Exposure Limits
2-(Dimethylamino)ethanol 108-01-0			

Engineering Controls:
Ensure adequate ventilation.
Occupational exposure controls:
Handle in accordance with good industrial hygiene and safety practice.
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.
Control of environmental exposure:
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.
Respiratory protection
None under normal use. If risk assessment shows air-purifying respirators are appropriate, use a full-face respirator with an NIOSH approved organic vapor/acid gas cartridge as a backup to engineering controls.
Hand protection
Glove material: Nitrile rubber disposable gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid contact with this product. Wash and dry hands.
Eye protection
Safety glasses with side-shields. If conditons warrent, wear safety googles and a faceshield. Maintain eyewash fountain in work area.
Skin and body protection
Maintain safety shower in work area. If conditons warrent, wear protective clothing such as boots, aprons and coveralls to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Grams VOC less water: 11	**Appearance:** Clear
Odor: Amine	**Vapor Pressure:** ND
Odor threshold: ND	**Vapor Density:** ND
pH: 11	**Melting point:** ND
Freezing point: < 32 F	**Solubility:** Complete in water
Boiling range: ND	**Flash point:** >200 F
Evaporation rate: ND	**Flammability:** ND
Explosive Limits: ND	**Partition coefficient (n-octanol/water):** ND
Autoignition temperature: ND	**Decomposition temperature:** ND
Specific Gravity: 0.986884484	

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Incompatibility materials
Strong oxidizers, Acids, copper, copper alloys.

Hazardous decomposition products
Thermal decomposition can lead to release of toxic gases and vapours.
Carbon oxides and nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

Mixture Toxicity
Inhalation Toxicity LC50: 15mg/L

Component Toxicity
108-01-0 2-(Dimethylamino)ethanol
Oral LD50: 1,803 mg/kg (Rat) Dermal LD50: 1,220 mg/kg (Rabbit) Inhalation LC50: 1,641 ppm (R

CAS Number	Description	% Weight	Carcinogen Rating

12. ECOLOGICAL INFORMATION

Ecotoxicity Avoid contaminating waterways.

Component Ecotoxicity
2-(Dimethylamino)ethanol
96 Hr LC50 Pimephales promelas: 81 mg/L [static]
48 Hr EC50 Daphnia magna: 98.77 mg/L
72 Hr EC50 Desmodesmus subspicatus: 35 mg/L

13. DISPOSAL CONSIDERATIONS

Product:
Must be disposed of in accordance with local and national regulations.
Contaminated Packaging:
Must be disposed of in accordance with local and national regulations. Rinse package before disposal.

14. TRANSPORT INFORMATION

Agency	Proper Shipping Name	UN Number	Packing Group	Hazard Class
DOT	2-Diethylaminoethanol solution	2686	II	8

15. REGULATORY INFORMATION

Massachusetts Right To Know Components
108-01-0 2-(Dimethylamino)ethanol

New Jersey Right To Know Components
108-01-0 2-(Dimethylamino)ethanol

Pennsylvania Right To Know Components
108-01-0 2-(Dimethylamino)ethanol

TSCA - All Components of this product are included in the United States TSCA Chemical Inventory.

SARA 311/312 - Acute Health Hazard.

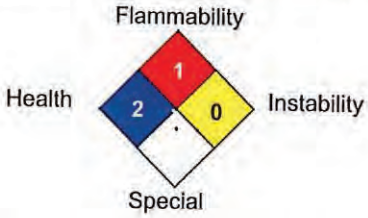
16. OTHER INFORMATION

Hazardous Material Information System (HMIS)

HEALTH	2
FLAMMABILITY	1
PHYSICAL HAZARD	0
PERSONAL PROTECTION	G

HMIS & NFPA Hazard Rating Legend
*** = Chronic Health Hazard**
0 = INSIGNIFICANT
1 = SLIGHT
2 = MODERATE
3 = HIGH

National Fire Protection Association (NFPA)



Date Prepared: 5/1/2015

Disclaimer: All information, recommendations and suggestions appearing herein are based upon sources believed to be reliable: However, it is the users responsibility to determine the safety, toxicity and suitability for its own use of this product. Barclay Water Management, Inc. does not assume any liability arising out of the use by others of this product.

APPENDIX E
NDI REPORTS

CORRTECH
CORROSION UNDERSTOOD

FIELD REPORT

Date(s):	12-10-2019	**Field Report No.**	14228-FIR-01-1

Project / Report Title: **BMC – 0.05 Sulfur Distillate Oil Tank 1 ID T- 4840/6TA** **OSFM# 02066 STI SP001 Inspection Report** **NDT and STI Inspection of 6 Tanks**	**Client:** **Omni Environmental Group, LLC** **6 Lancaster County Road** **Harvard, MA 01451**

Weather:	Overcast	**Temperature:**	40's

Background & Methods

CorrTech Inc. has performed an STI SP001 in service inspection of Barnhardt Manufacuring Company's one (1) 0.05 Sulfur Distillate Oil storage Tank 1 ID T-4840/6TA OSFM# 02066 in Colrain, MA for the Omni Environmental Group, LLC. This inspection was performed on December 10, 2019 under CorrTech Job No. 14228.

0.05 Sulfur Distillate Oil storage Tank 1 is a steel welded double walled AST with a capacity of 20,000 gallons.

Inspection was performed in accordance with Steel Tank Institute (STI) Standard SP001, "Standard for the Inspection of Above Ground Storage Tanks."

TEST PROCEDURES

The tank was not entered for internal inspection. All inspections, measurements and observations were performed on the exterior surfaces. Assessment of internal pitting activity was not performed.

Inspection for cracks, blisters, peeling, delamination's and other anomalies was performed on external surfaces.

Visual examination of exposed piping, auxiliary equipment, joint welds and connections for misalignment and tightness were performed, pipe flanges were inspected for gasket deterioration and misalignment. This inspection considered tank systems attached to the tank.

This report presents all data obtained during the tank inspection, photographs of significance and other pertinent information. This report stated the condition of the tank with respect to UL-2085, STI SP001 and State regulations.

CorrTech inspection protocol employed sampling and testing procedures, with suitable and calibrated instrumentation, to provide the required information. The inspection team evaluated each structure. The standard protocol was followed, and additional analysis and sampling/testing procedures were utilized as determined in the field to ensure proper and adequate evaluation of the structures of interest.

Observations

CONTAINMENT
0.05 Sulfur Distillate Oil storage Tank 1 is a double walled AST. The interstitial space between the two walls provides the containment for the contents of the tank. Interstitial leak detection equipment is installed on the viewing port that the end of the tank.

In the event of an alarm any liquid is drained through the drain port on the underside of the tank. Leak detection was tested at the time of the inspection and is in working order.

Adjacent to the tank is a concrete berm is in place that acts as containment for any trucks filling the tank. This berm also acts as spill control for the fill port. The floor of the berm was free from any significant cracking or spalling.

STRUCTURE
This tank is supported by three steel saddles that are anchored to concrete pads. Each saddle has four anchors that were all properly engaged. General corrosion was noted on the steel saddles, however there was no visible metal loss. The concrete pads were all free from significant cracking or spalling.

There was no visible buckling or bulging noted on the exterior wall of the interstice.

NOZZLES
All tank nozzles and ports were free from excessive corrosion or visual leaks.

INSULATION
The entire vessel is covered in fiberglass insulation beneath metal cladding. The majority of the insulation is intact with on 2-in by 4-in section missing on the upper portion of the shell. The insulation cladding is free from significant damage. Where the cladding was cut for ultrasonic thickness readings minor moisture was noted but the insulation was not saturated. General corrosion of the exterior wall of the interstice was noted in these areas.

EQUIPMENT
The normal vent is too low to the roof of the tank and can be covered by snow.
The emergency vent moves freely and seats properly.
The interstitial leak detection alarm is installed and working.
A level indicator is installed on the roof of the tank as well as in the adjacent building.
Overfill alarms are installed on the tank.
Spill control is in place around the fill ports.
Grounding wire is free from excessive corrosion.

ULTRA SONIC THICKNESS READINGS
Ultrasonic thickness readings were taken on the shell and head of the tank to check for any metal loss on the interior of secondary wall of the tank, The average thickness for the head was 0.253-in, the maximum reading was 0.255-in, the minimum reading was 0.350-in, and the standard deviation for the readings was 0.003-in. The shell thickness readings averaged 0.178-in, with a maximum reading of 0.180-in, a minimum reading 0.170, and the standard deviation of 0.004-in.

Based on the data gathered there does not appear to any metal loss on the interior of the secondary wall.

Conclusions & Recommendations

The Barnhardt Manufacturing Company 0.05 Sulfur Distillate storage Tank 1 ID T-4840/6TA OSFM# 02066 is fit for continued service.

With the spill control and Continuous Release Detection Method (CRDM) in place on this AST it is designated as a Category 1 tank. A Category 1 tank with a capacity between 5,001 - 30,000 gallons requires periodic AST inspection (monthly or yearly) by the owner's inspector and a formal external inspection performed by a Certified Inspector in at least 20 years, per STI SP001 standards.

Snow should be regularly cleared from normal and emergency vent to maintain proper functionality. The normal vent could be extended up to avoid the typical snow load of the tank.

The exterior insulation is no longer required due to the change of material held within the vessel. This insulation could be removed to prevent further corrosion of the exterior of the secondary wall from water being retained in the fiberglass insulation.

Attachments STI SP001 Inspection Annual Checklist
Ultrasonic Thickness Data

Employee Name:
Garth Lund

Prepared By:
CORRTECH, INC.

Garth Lund
Project Engineer
NACE CIP 2
STI SP001 Inspector
CorrTech, Inc.
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Deep River, CT 06417
Tel (860) 526-2610
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The above constitutes CorrTech's understanding of all items discussed and/or items noted.

All concerned parties shall review this report and comment within seven days if any of the items require clarification, correction, and/or require additional discussion.

RELATED FILES

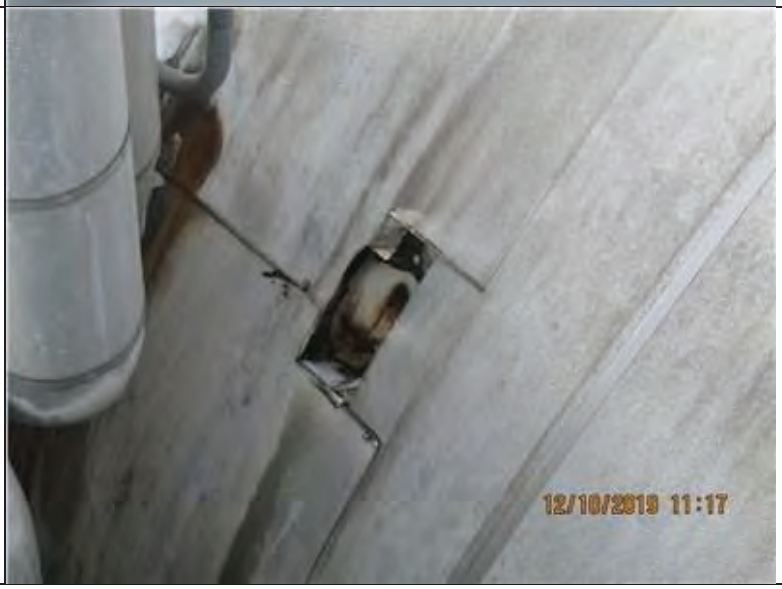
Description	File Attachment
01 - Tank overview	
02 - Fill port located in concrete containment berm	
03 - Typical condition of the metal insulation cladding	

Description	File Attachment
04 - Intact insulation over tank end cap	
05 - Insulation cladding free from damage or soiling	
06 - Typical steel saddle with concrete foundation pad	

Description	File Attachment
07 - Saddle free from metal loss	
08 - General surface corrosion on tank saddle	
09 - Concrete foundation pad free from cracking or spalling	

Description	File Attachment
10 - Level indicator located inside adjacent building	
11 - Tank piping with intact insulation	
12 - Interstitial leak alarm and overfill alarm	

Description	File Attachment
13 - Overfill alarm warning light	
14 - Fill port and normal vent	
15 - Draw and return piping running through bolted roof hatch	

Description	File Attachment
16 - Visual level indicator	
17 - 10-in emergency vent	
18 - Minor missing section of insulation cladding	

Description	File Attachment
19 - Properly engaged anchor bolt	

STI SP001 Annual Inspection Checklist

General Inspection Information:

Inspection Date: 12-10 2019 Prior Inspection Date: _____ Retain until date: 12-10-2020

Inspector Name (print): Gavin Lund Title: STI SP001

Inspector's Signature: GLd

Tank(s) inspected ID Tank 1 ID T-4840/GTA OSFM # 02066

Regulatory facility name and ID number (if applicable) Barnhardt Manufacturing Co Colrain, MA

Inspection Guidance:

- This checklist is intended as a model. Locally developed checklists are acceptable as long as they are substantially equivalent (as applicable).
- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector per paragraph 4.1.2 of the standard.
- Remove promptly standing water or liquid discovered in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility should regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for at least 36 months.
- Complete this checklist on an annual basis, supplemental to the owner monthly-performed inspection checklists.
- **Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.**

	ITEM	STATUS	COMMENTS / DATE CORRECTED
	Tank Foundation/Supports		
1	Free of tank settlement or foundation washout?	☒Yes ☐No	
2	Concrete pad or ring wall free of cracking and spalling?	☒Yes ☐No ☐N/A	

3	Tank supports in satisfactory condition?	☑Yes ☐No ☐N/A	minor surface corrosion no metal loss
4	Is water able to drain away from tank if tank is resting on a foundation or on the ground?	☑Yes ☐No ☐N/A	
5	Is the grounding strap between the tank and foundation/supports in good condition?	☑Yes ☐No ☐N/A	
	Tank Shell, Heads and Roof		
6	Free of visible signs of coating failure?	☑Yes ☐No	Insulated General corrosion noted where UT coupons were cut
7	Free of noticeable distortions, buckling, denting, or bulging?	☑Yes ☐No	
8	Free of standing water on roof?	☑Yes ☐No ☐N/A	
9	Are all labels and tags intact and legible?	☑Yes ☐No	
	Tank Manways, Piping, and Equipment		
10	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	☑Yes ☐No ☐N/A	
	Tank Equipment		
11	Normal and emergency vents free of obstructions?	☑Yes ☐No	
12	Normal vent on tanks storing gasoline equipped with pressure/vacuum vent?	☐Yes ☐No ☑N/A	
13	Are flame arrestors free of corrosion and are air passages free of blockage?	☐Yes ☐No ☑N/A	
14	Is the emergency vent in good working condition and functional, as required by manufacturer? Consult manufacturer's requirements. Verify that components are moving freely (including long-bolt manways).	☑Yes ☐No ☐N/A	
15	Is interstitial leak detection equipment in good condition? Are windows on sight gauges clear? Are wire connections intact? If equipment has a test function, does it activate to confirm operation?"	☑Yes ☐No ☐N/A	Electric monitor on interstice tested 12-10-19

16	Are all valves free of leaks, corrosion and other damage? Follow manufacturers' instructions for regular maintenance of these items. Check the following and verify (as applicable): □ Anti-siphon valve □ Check valve □ Gate valve □ Pressure regulator valve □ Expansion relief valve □ Solenoid valve □ Fire valve □ Shear valve	☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☐N/A ☐Yes ☐No ☐N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☐N/A	
17	Are strainers and filters clean and in good condition?	☐Yes ☐No ☑N/A	
	Insulated Tanks		
18	Free of missing insulation? Insulation free of visible signs of damage? Insulation adequately protected from water intrusion?	☑Yes ☐No ☐N/A	Cladding is intact no significant missing portions.
19	Insulation free of noticeable areas of moisture?	☑Yes ☐No ☐N/A	minor dampness at lower portions not saturated
20	Insulation free of mold?	☑Yes ☐No ☐N/A	
21	Free of visible signs of coating failure?	☐Yes ☐No ☑N/A	
	Tank / Piping Release Detection		
22	Is inventory control being performed and documented if required?	☑Yes ☐No ☐N/A	
23	Is release detection being performed and documented if required?	☑Yes ☐No ☐N/A	
	Other Equipment		
24	Are electrical wiring and boxes in good condition?	☑Yes ☐No ☐N/A	
25	Has the cathodic protection system on the tank been tested as required by the designing engineer?	☐Yes ☐No ☑N/A	

Heads		Shell	
Readings		Readings	
1	0.255	1	0.180
2	0.255	2	0.180
3	0.255	3	0.180
4	0.250	4	0.175
5	0.250	4	0.180
6	0.250	6	0.170
7	0.255	7	0.175
8	0.250	8	0.180
Average	0.253	Average	0.178
MIN	0.250	MIN	0.170
MAX	0.255	MAX	0.180
STD DEV	0.003	STD DEV	0.004

CORRTECH
CORROSION UNDERSTOOD

FIELD REPORT

Date(s):	12-10-2019	**Field Report No.**	14228-FIR-02-1

Project / Report Title: **BMC – 0.05 Sulfur Distillate Oil Tank 2 ID T-4841/6TB** **OSFM# 02067 STI SP001 Inspection Report** **NDT and STI Inspection of 6 Tanks**	**Client:** **Omni Environmental Group, LLC** **6 Lancaster County Road** **Harvard, MA 01451**

Weather:	Overcast	**Temperature:**	40's

Background & Methods

CorrTech Inc. has performed an STI SP001 in service inspection of Barnhardt Manufacturing Company's one (1) 0.05 Sulfur Distillate Oil storage Tank 2 ID T-4841/6TB OSFM# 02067 in Colrain, MA for the Omni Environmental Group, LLC. This inspection was performed on December 10, 2019 under CorrTech Job No. 14228.

0.05 Sulfur Distillate Oil storage Tank 2 is a steel welded double walled AST with a capacity of 20,000 gallons.

Inspection was performed in accordance with Steel Tank Institute (STI) Standard SP001, “Standard for the Inspection of Above Ground Storage Tanks.”

TEST PROCEDURES
The tank was not entered for internal inspection. All inspections, measurements and observations were performed on the exterior surfaces. Assessment of internal pitting activity was not performed.

Inspection for cracks, blisters, peeling, delamination’s and other anomalies was performed on external surfaces.

Visual examination of exposed piping, auxiliary equipment, joint welds and connections for misalignment and tightness were performed, pipe flanges were inspected for gasket deterioration and misalignment. This inspection considered tank systems attached to the tank.

This report presents all data obtained during the tank inspection, photographs of significance and other pertinent information. This report stated the condition of the tank with respect to UL-2085, STI SP001 and State regulations.

CorrTech inspection protocol employed sampling and testing procedures, with suitable and calibrated instrumentation, to provide the required information. The inspection team evaluated each structure. The standard protocol was followed, and additional analysis and sampling/testing procedures were utilized as determined in the field to ensure proper and adequate evaluation of the structures of interest.

Observations

CONTAINMENT
0.05 Sulfur Distillate Oil storage Tank 1 is a double walled AST. The interstitial space between the two walls provides the containment for the contents of the tank. Interstitial leak detection equipment is installed on the viewing port that the end of the tank.

In the event of an alarm any liquid is drained through the drain port on the underside of the tank. Leak detection was tested at the time of the inspection and is in working order.

Beside the tank a concrete berm is in place that acts as containment for any trucks filling the tank. This berm also acts as spill control for the fill port. The floor of the berm was free from any significant cracking or spalling.

STRUCTURE
This tank is supported by three steel saddles that are anchored to concrete pads. Each saddle has four anchors that were all properly engaged. General corrosion was noted on the steel saddles, however there was no visible metal loss. The concrete pads were all free from significant cracking or spalling.

There was no visible buckling or bulging noted on the exterior wall of the interstice.

NOZZLES

All tank nozzles and ports were free from excessive corrosion or visual leaks.

COATING
The exterior coating system was almost entirely intact with 2 areas of corrosion noted. Cracking has formed in the coating on the end caps and roof of the tank. The cracking has not led to any significant coating loss at the time of the inspection. A moderate bio film has formed end caps and underside of the tank.

EQUIPMENT
The normal vent is too low to the roof of the tank and can be covered by snow.
The emergency vent moves freely and seats properly.
The interstitial leak detection alarm is installed and working.
A level indicator is installed on the roof of the tank as well as in the adjacent building.
Overfill alarms are installed on the tank.
Spill control is in place around the fill ports.
Grounding wire is free from corrosion.

ULTRA SONIC THICKNESS READINGS
Ultrasonic thickness readings were taken on the shell and heads of the tank to check for any metal loss on the interior of secondary wall of the tank, The average thickness for the heads was 0.138-in, the maximum reading was 0.240-in, the minimum reading was 0.235-in, and the standard deviation for the readings was 0.003-in. The shell thickness readings averaged 0.177-in, with a maximum reading of 0.180-in, a minimum reading 0.175, and the standard deviation of 0.002-in.

Based on the data gathered there does not appear to any metal loss on the interior of the secondary wall.

Conclusions & Recommendations

The Barnhardt Manufacturing Company 0.05 Sulfur Distillate storage Tank 1 ID T-4841/6TB OSFM# 02067 is fit for continued service.

With the spill control and Continuous Release Detection Method (CRDM) in place on this AST it is designated as a Category 1 tank. A Category 1 tank with a capacity between 5,001 - 30,000 gallons requires periodic AST inspection (monthly or yearly) by the owner's inspector and a formal external inspection performed by a Certified Inspector in at least 20 years, per STI SP001 standards.

	Snow should be regularly cleared from normal and emergency vent to maintain proper functionality. The normal vent could be extended up to avoid the typical snow load of the tank.
Attachments	STI SP001 Annual Checklist Ultrasonic Thickness Data

Employee Name: Garth Lund	The above constitutes CorrTech's understanding of all items discussed and/or items noted. All concerned parties shall review this report and comment within seven days if any of the items require clarification, correction, and/or require additional discussion.
Prepared By: CORRTECH, INC.  Garth Lund Project Engineer NACE CIP 2 STI SP001 Inspector CorrTech, Inc. 455 Main St. Bldg. 1 Suite A Deep River, CT 06417 Tel (860) 526-2610 Cell (860)304-8880 Fax (860) 526-5018 glund@corrtech-inc.com	

RELATED FILES

Description	File Attachment
01 - Tank overview	

Description	File Attachment
02 - NFPA Fire diamond and material identification sign	
03 - Fill port in concrete truck containment	
04 - Typical condition of steel saddle and concrete foundation pad	

Description	File Attachment
05 - Minor corrosion between saddle and tank	
06 - Concrete foundation free from cracking or spalling	
07 - Properly engaged anchor bolt	

Description	File Attachment
08 - Typical condition of underside coating with biological staining	
09 - Interstice drain port	
10 - Typical condition of exterior coating system	

Description	File Attachment
11 - Coating cracking forming on top side of tank	
12 - Interstitial leak detection equipment	
13 - Interstitial leak alarm and overfill alarm	

Description	File Attachment
14 - Level indicator located inside adjacent building	
15 - Intact coating with biological staining	
16 - Fill piping and normal vent covered in snow	

Description	File Attachment
17 - Level indicator	
18 - Draw and return piping running through bolted roof hatch	
19 - Emergency vent covered in snow	

STI SP001 Annual Inspection Checklist

General Inspection Information:

Inspection Date: 12-10-2019 Prior Inspection Date: _____ Retain until date: 12-10-2020

Inspector Name (print): Garth Lund Title: STI SP001

Inspector's Signature: GLud

Tank(s) inspected ID Tank 2 ID T-841/6TB OSFM# 02067

Regulatory facility name and ID number (if applicable) Barnhardt Manufacturing CO Colrain, MA

Inspection Guidance:

- This checklist is intended as a model. Locally developed checklists are acceptable as long as they are substantially equivalent (as applicable).
- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector per paragraph 4.1.2 of the standard.
- Remove promptly standing water or liquid discovered in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility should regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for at least 36 months.
- Complete this checklist on an annual basis, supplemental to the owner monthly-performed inspection checklists.
- **Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.**

	ITEM	STATUS	COMMENTS / DATE CORRECTED
	Tank Foundation/Supports		
1	Free of tank settlement or foundation washout?	☑Yes ☐No	
2	Concrete pad or ring wall free of cracking and spalling?	☑Yes ☐No ☐N/A	

3	Tank supports in satisfactory condition?	☑Yes ☐No ☐N/A	
4	Is water able to drain away from tank if tank is resting on a foundation or on the ground?	☑Yes ☐No ☐N/A	
5	Is the grounding strap between the tank and foundation/supports in good condition?	☑Yes ☐No ☐N/A	
	Tank Shell, Heads and Roof		
6	Free of visible signs of coating failure?	☑Yes ☐No	Start of coating cracking could lead to more significant coating loss
7	Free of noticeable distortions, buckling, denting, or bulging?	☑Yes ☐No	
8	Free of standing water on roof?	☑Yes ☐No ☐N/A	
9	Are all labels and tags intact and legible?	☑Yes ☐No	
	Tank Manways, Piping, and Equipment		
10	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	☑Yes ☐No ☐N/A	
	Tank Equipment		
11	Normal and emergency vents free of obstructions?	☑Yes ☐No	Clear snow to ensure proper functionality
12	Normal vent on tanks storing gasoline equipped with pressure/vacuum vent?	☐Yes ☐No ☑N/A	
13	Are flame arrestors free of corrosion and are air passages free of blockage?	☐Yes ☐No ☑N/A	
14	Is the emergency vent in good working condition and functional, as required by manufacturer? Consult manufacturer's requirements. Verify that components are moving freely (including long-bolt manways).	☑Yes ☐No ☐N/A	
15	Is interstitial leak detection equipment in good condition? Are windows on sight gauges clear? Are wire connections intact? If equipment has a test function, does it activate to confirm operation?"	☑Yes ☐No ☐N/A	leak sensor tested GL 12-10-19

16	Are all valves free of leaks, corrosion and other damage? Follow manufacturers' instructions for regular maintenance of these items. Check the following and verify (as applicable): □ Anti-siphon valve □ Check valve □ Gate valve □ Pressure regulator valve □ Expansion relief valve □ Solenoid valve □ Fire valve □ Shear valve	 ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A	
17	Are strainers and filters clean and in good condition?	☐Yes ☐No ☑N/A	
	Insulated Tanks		
18	Free of missing insulation? Insulation free of visible signs of damage? Insulation adequately protected from water intrusion?	☐Yes ☐No ☑N/A	
19	Insulation free of noticeable areas of moisture?	☐Yes ☐No ☑N/A	
20	Insulation free of mold?	☐Yes ☐No ☑N/A	
21	Free of visible signs of coating failure?	☐Yes ☐No ☑N/A	
	Tank / Piping Release Detection		
22	Is inventory control being performed and documented if required?	☑Yes ☐No ☐N/A	
23	Is release detection being performed and documented if required?	☑Yes ☐No ☐N/A	
	Other Equipment		
24	Are electrical wiring and boxes in good condition?	☑Yes ☐No ☐N/A	
25	Has the cathodic protection system on the tank been tested as required by the designing engineer?	☐Yes ☐No ☑N/A	

Additional Comments: Fill ports contained in a containment structure for filling trucks

Heads		Shell	
Readings		Readings	
1	0.240	1	0.175
2	0.240	2	0.175
3	0.240	3	0.175
4	0.240	4	0.175
5	0.235	4	0.175
6	0.235	6	0.175
7	0.235	7	0.175
8	0.235	8	0.175
Average	0.238	9	0.175
MIN	0.235	10	0.175
MAX	0.240	11	0.180
STD DEV	0.003	12	0.175
		13	0.180
		14	0.180
		15	0.180
		16	0.180
		Average	0.177
		MIN	0.175
		MAX	0.180
		STD DEV	0.002

CORRTECH
CORROSION UNDERSTOOD

FIELD REPORT

Date(s):	12-10-2019	**Field Report No.**	14228-FIR-03-1

Project / Report Title: **BMC – 0.05 Sulfur Distillate Oil Tank 3 ID T-4842/2TA** **OSFM# 02064 STI SP001 Inspection Report** **NDT and STI Inspection of 6 Tanks**	**Client:** **Omni Environmental Group, LLC** **6 Lancaster County Road** **Harvard, MA 01451**

Weather:	Overcast	**Temperature:**	40's

Background & Methods

CorrTech Inc. has performed an STI SP001 in service inspection of Barnhardt Manufacturing Company's one (1) 0.05 Sulfur Distillate Oil storage Tank 3 ID T-4842/2TA OSFM# 02064 in Colrain, MA for the Omni Environmental Group, LLC. This inspection was performed on December 10, 2019 under CorrTech Job No. 14228.

0.05 Sulfur Distillate Oil storage Tank 3 is a steel welded double walled AST with a capacity of 20,000 gallons.

Inspection was performed in accordance with Steel Tank Institute (STI) Standard SP001, “Standard for the Inspection of Above Ground Storage Tanks.”

TEST PROCEDURES

The tank was not entered for internal inspection. All inspections, measurements and observations were performed on the exterior surfaces. Assessment of internal pitting activity was not performed.

Inspection for cracks, blisters, peeling, delamination’s and other anomalies was performed on external surfaces.

Visual examination of exposed piping, auxiliary equipment, joint welds and connections for misalignment and tightness were performed, pipe flanges were inspected for gasket deterioration and misalignment. This inspection considered tank systems attached to the tank.

This report presents all data obtained during the tank inspection, photographs of significance and other pertinent information. This report stated the condition of the tank with respect to UL-2085, STI SP001 and State regulations.

CorrTech inspection protocol employed sampling and testing procedures, with suitable and calibrated instrumentation, to provide the required information. The inspection team evaluated each structure. The standard protocol was followed, and additional analysis and sampling/testing procedures were utilized as determined in the field to ensure proper and adequate evaluation of the structures of interest.

Observations

CONTAINMENT
0.05 Sulfur Distillate Oil storage Tank 3 is a double walled welded steel AST. The interstitial space between the two walls provides the containment for the contents of the tank.

Interstitial leak detection equipment is installed on the viewing port that the end of the tank. In the event of an alarm any liquid is drained through the drain port on the underside of the tank. Leak detection was tested at the time of the inspection and is in working order.

A concrete berm is in place that acts as containment for truck filling spills. This berm also acts as spill control for the fill port. The floor of the berm was free from any significant cracking or spalling.

STRUCTURE
This tank is supported by three steel saddles that are anchored to concrete pads. Each saddle has four anchors that were all properly engaged. General corrosion was noted on the steel saddles, however there was no visible metal loss. The concrete pads were all free from significant cracking or spalling.

There was no visible buckling or bulging noted on the exterior wall of the interstice.

NOZZLES

All tank nozzles and ports were free from excessive corrosion or visual leaks.

COATING
Cracking in the coating was observed on the top of the tank. This cracking has not led to any significant coating loss. No significant corrosion was observed on the exterior coating of the secondary tank wall. A moderate bio film has formed end caps and shell of the tank.

EQUIPMENT
The normal vent is too low to the roof of the tank and can be covered by snow.
The emergency vent moves freely and seats properly.
The interstitial leak detection alarm is installed and working.
A level indicator is installed on the roof of the tank as well as in the adjacent building.
Overfill alarms are installed on the tank.
Spill control is in place around the fill ports.
Grounding wire is free from corrosion.

ULTRA SONIC THICKNESS READINGS
Ultrasonic thickness readings were taken on the shell and heads of the tank to check for any metal loss on the interior of secondary wall of the tank, The average thickness for the heads was 0.240-in, the maximum reading was 0.240-in, the minimum reading was 0.240-in, and the standard deviation for the readings was 0.000-in. The shell thickness readings averaged 0.176-in, with a maximum reading of 0.180-in, a minimum reading 0.175, and the standard deviation of 0.002-in.

Based on the data gathered there does not appear to any metal loss on the interior of the secondary wall.

Conclusion & Recommendations

The Barnhardt Manufacturing Company 0.05 Sulfur Distillate storage Tank 3 ID T-4842/2TA OSFM# 02064 is fit for continued service.

With the spill control and Continuous Release Detection Method (CRDM) in place on this AST it is designated as a Category 1 tank. A Category 1 tank with a capacity between 5,001 - 30,000 gallons requires periodic AST inspection (monthly or yearly) by the owner's inspector and a formal external inspection performed by a Certified

	Inspector in at least 20 years, per STI SP001 standards. Snow should be regularly cleared from normal and emergency vent to maintain proper functionality. The normal vent could be extended up to avoid the typical snow load of the tank.
Attachments	STI SP001 Annual Checklist UT Data

Employee Name: Garth Lund	The above constitutes CorrTech's understanding of all items discussed and/or items noted. All concerned parties shall review this report and comment within seven days if any of the items require clarification, correction, and/or require additional discussion.
Prepared By:	
CORRTECH, INC.  Garth Lund Project Engineer NACE CIP 2 STI SP001 Inspector CorrTech, Inc. 455 Main St. Bldg. 1 Suite A Deep River, CT 06417 Tel (860) 526-2610 Cell (860)304-8880 Fax (860) 526-5018 glund@corrtech-inc.com	

RELATED FILES

Description	File Attachment
01 - Tank overview	

Description	File Attachment
02 - Tank identificaiton	
03 - NFPA diamond and material labeling	
04 - Interstitial and overfill alarm	

Description	File Attachment
05 - Typical steel tank saddle and concrete foundation pad	
06 - Steel saddle free from corrosion and metal loss	
07 - Concrete foundation free from cracking and spalling	

Description	File Attachment
08 - Typical condition of end cap and shell coating	
09 - Intact underside coating with biological staining	
10 - Typical condition of exterior coating system	

Description	File Attachment
11 - Intact coating with biological staining	
12 - Fill port with spill control	
13 - Intact shell coating	

Description	File Attachment
14 - Fill port, normal vent, and sensor port	
15 - Coating cracking around roof ports	
16 - Level indicator, emergency vent, draw piping, and return piping	

STI SP001 Annual Inspection Checklist

General Inspection Information:

Inspection Date: 12-10-2019 Prior Inspection Date: _____ Retain until date: _____

Inspector Name (print): Garth Lund Title: STI SP001

Inspector's Signature: G Lud

Tank(s) inspected ID Tank 3 ID T-4842/2TA OSFM# 02064

Regulatory facility name and ID number (if applicable) Barnhardt Manufacturing Co. Colrain, MA

Inspection Guidance:

- This checklist is intended as a model. Locally developed checklists are acceptable as long as they are substantially equivalent (as applicable).
- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector per paragraph 4.1.2 of the standard.
- Remove promptly standing water or liquid discovered in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility should regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for at least 36 months.
- Complete this checklist on an annual basis, supplemental to the owner monthly-performed inspection checklists.
- **Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.**

	ITEM	STATUS	COMMENTS / DATE CORRECTED
	Tank Foundation/Supports		
1	Free of tank settlement or foundation washout?	☑Yes ☐No	
2	Concrete pad or ring wall free of cracking and spalling?	☑Yes ☐No ☐N/A	

3	Tank supports in satisfactory condition?	☑Yes ☐No ☐N/A	
4	Is water able to drain away from tank if tank is resting on a foundation or on the ground?	☑Yes ☐No ☐N/A	
5	Is the grounding strap between the tank and foundation/supports in good condition?	☑Yes ☐No ☐N/A	
	Tank Shell, Heads and Roof		
6	Free of visible signs of coating failure?	☑Yes ☐No	coating cracking on roof could lead to more significant loss
7	Free of noticeable distortions, buckling, denting, or bulging?	☑Yes ☐No	
8	Free of standing water on roof?	☑Yes ☐No ☐N/A	
9	Are all labels and tags intact and legible?	☑Yes ☐No	
	Tank Manways, Piping, and Equipment		
10	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	☑Yes ☐No ☐N/A	
	Tank Equipment		
11	Normal and emergency vents free of obstructions?	☑Yes ☐No	remove snow to ensure proper function
12	Normal vent on tanks storing gasoline equipped with pressure/vacuum vent?	☐Yes ☐No ☑N/A	
13	Are flame arrestors free of corrosion and are air passages free of blockage?	☐Yes ☐No ☑N/A	
14	Is the emergency vent in good working condition and functional, as required by manufacturer? Consult manufacturer's requirements. Verify that components are moving freely (including long-bolt manways).	☑Yes ☐No ☐N/A	
15	Is interstitial leak detection equipment in good condition? Are windows on sight gauges clear? Are wire connections intact? If equipment has a test function, does it activate to confirm operation?"	☑Yes ☐No ☐N/A	Leak detetion alarm tested GL 12-10-19

16	Are all valves free of leaks, corrosion and other damage? Follow manufacturers' instructions for regular maintenance of these items. Check the following and verify (as applicable): □ Anti-siphon valve □ Check valve □ Gate valve □ Pressure regulator valve □ Expansion relief valve □ Solenoid valve □ Fire valve □ Shear valve	☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☐N/A	
17	Are strainers and filters clean and in good condition?	☐Yes ☐No ☑N/A	
	Insulated Tanks		
18	Free of missing insulation? Insulation free of visible signs of damage? Insulation adequately protected from water intrusion?	☐Yes ☐No ☑N/A	
19	Insulation free of noticeable areas of moisture?	☐Yes ☐No ☑N/A	
20	Insulation free of mold?	☐Yes ☐No ☑N/A	
21	Free of visible signs of coating failure?	☐Yes ☐No ☑N/A	
	Tank / Piping Release Detection		
22	Is inventory control being performed and documented if required?	☑Yes ☐No ☐N/A	
23	Is release detection being performed and documented if required?	☑Yes ☐No ☐N/A	
	Other Equipment		
24	Are electrical wiring and boxes in good condition?	☑Yes ☐No ☐N/A	
25	Has the cathodic protection system on the tank been tested as required by the designing engineer?	☐Yes ☐No ☑N/A	

Additional Comments: Fill ports contained in truck containment

End Cap		Shell	
Readings		Readings	
1	0.240	1	0.180
2	0.240	2	0.180
3	0.240	3	0.180
4	0.240	4	0.175
5	0.240	4	0.175
6	0.240	6	0.175
7	0.240	7	0.175
8	0.240	8	0.175
Average	0.240	9	0.175
MIN	0.240	10	0.175
MAX	0.240	11	0.175
STD DEV	0.000	12	0.175
		13	0.175
		14	0.175
		15	0.175
		16	0.175
		Average	0.176
		MIN	0.175
		MAX	0.180
		STD DEV	0.002

CORRTECH
CORROSION UNDERSTOOD

FIELD REPORT

Date(s):	12-10-2019	**Field Report No.**	14228-FIR-04-1

Project / Report Title: **BMS – 0.05 Sulfur Distillate Storage Tank 4 ID T-4843/2TB OSFM# 02065** **NDT and STI Inspection of 6 Tanks**	**Client:** **Omni Environmental Group, LLC** **6 Lancaster County Road** **Harvard, MA 01451**

Weather:	Overcast	**Temperature:**	40's

Background & Methods

CorrTech Inc. has performed an STI SP001 in service inspection of Barnhardt Manufacturing Company's one (1) 0.05 Sulfur Distillate Oil storage Tank 4 ID T-4843/2TB OSFM# 02065 in Colrain, MA for the Omni Environmental Group, LLC. This inspection was performed on December 10, 2019 under CorrTech Job No. 14228.

0.05 Sulfur Distillate Oil storage Tank 4 is a steel welded double walled AST with a capacity of 20,000 gallons.

Inspection was performed in accordance with Steel Tank Institute (STI) Standard SP001, “Standard for the Inspection of Above Ground Storage Tanks.”

TEST PROCEDURES

The tank was not entered for internal inspection. All inspections, measurements and observations were performed on the exterior surfaces. Assessment of internal pitting activity was not performed.

Inspection for cracks, blisters, peeling, delamination’s and other anomalies was performed on external surfaces.

Visual examination of exposed piping, auxiliary equipment, joint welds and connections for misalignment and tightness were performed, pipe flanges were inspected for gasket deterioration and misalignment. This inspection considered tank systems attached to the tank.

This report presents all data obtained during the tank inspection, photographs of significance and other pertinent information. This report stated the condition of the tank with respect to UL-2085, STI SP001 and State regulations.

CorrTech inspection protocol employed sampling and testing procedures, with suitable and calibrated instrumentation, to provide the required information. The inspection team evaluated each structure. The standard protocol was followed, and additional analysis and sampling/testing procedures were utilized as determined in the field to ensure proper and adequate evaluation of the structures of interest.

Observations

CONTAINMENT
0.05 Sulfur Distillate Oil storage Tank 4 is a double walled welded steel AST. The interstitial space between the two walls provides the containment for the contents of the tank. Interstitial leak detection equipment is installed on the viewing port that the end of the tank.

In the event of an alarm any liquid is drained through the drain port on the underside of the tank. Leak detection was tested at the time of the inspection and is in working order.

A concrete berm is in place that acts as containment for any truck spills during tank filling. This berm also acts as spill control for the fill port. The floor of the berm was free from any significant cracking or spalling.

STRUCTURE
This tank is supported by three steel saddles that are anchored to concrete pads. Each saddle has four anchors and all but one anchor was properly engaged. General corrosion was noted on the steel saddles, however there was no visible metal loss. The concrete pads were all free from significant cracking or spalling.

There was no visible buckling or bulging noted on the exterior wall of the interstice.

NOZZLES

All tank nozzles and ports were free from excessive corrosion or visual leaks.

COATING
The exterior coating is free from any coating loss, adhesion loss, or active corrosion. There is a moderate layer of bio staining present on the exterior coated surfaces of the tank.

EQUIPMENT
The normal vent is too low to the roof of the tank and can be covered by snow.
The emergency vent moves freely and seats properly.
The interstitial leak detection alarm is installed and working.
A level indicator is installed on the roof of the tank as well as in the adjacent building.
Overfill alarms are installed on the tank.
Spill control is in place around the fill ports.
Grounding wire is free from corrosion.

ULTRA SONIC THICKNESS READINGS
Ultrasonic thickness readings were taken on the shell and heads of the tank to check for any metal loss on the interior of secondary wall of the tank, The average thickness for the heads was 0.239-in, the maximum reading was 0.240-in, the minimum reading was 0.235-in, and the standard deviation for the readings was 0.002-in. The shell thickness readings averaged 0.174-in, with a maximum reading of 0.175-in, a minimum reading 0.170, and the standard deviation of 0.002-in.

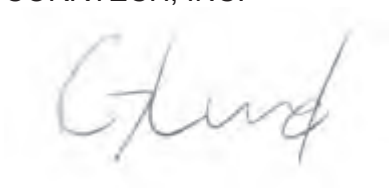
Based on the data gathered there does not appear to any metal loss on the interior of the secondary wall.

Conclusions & Recommendations

The Barnhardt Manufacturing Company 0.05 Sulfur Distillate storage Tank 4 ID T-4843/2TB OSFM# 02065 is fit for continued service.

With the spill control and Continuous Release Detection Method (CRDM) in place on this AST it is designated as a Category 1 tank. A Category 1 tank with a capacity between 5,001 - 30,000 gallons requires periodic AST inspection (monthly or yearly) by the owner's inspector and a formal external inspection performed by a Certified Inspector in at least 20 years, per STI SP001 standards.

	Snow should be regularly cleared from normal and emergency vent to maintain proper functionality. The normal vent could be extended up to avoid the typical snow load of the tank.
Attachments	STI SP001 Annual Checklist Ultrasonic Thickness Data

Employee Name: Garth Lund	The above constitutes CorrTech's understanding of all items discussed and/or items noted. All concerned parties shall review this report and comment within seven days if any of the items require clarification, correction, and/or require additional discussion.
Prepared By: CORRTECH, INC.  Garth Lund Project Engineer NACE CIP 2 STI SP001 Inspector CorrTech, Inc. 455 Main St. Bldg. 1 Suite A Deep River, CT 06417 Tel (860) 526-2610 Cell (860)304-8880 Fax (860) 526-5018 glund@corrtech-inc.com	

RELATED FILES

Description	File Attachment
01 - Tank overview	

Description	File Attachment
02 - NFPA Fire diamond and material identification sign	
03 - Typical condition of exterior coating system	
04 - Typical condition of steel saddle and concrete foundation pad	

Description	File Attachment
05 - Steel saddle free from corrosion and metal loss	
06 - Concrete foundation free from cracking or spalling	
07 - Intact coating on the underside of tank	

Description	File Attachment
08 - Intact coating system with moderate biostaining	
09 - Interstice view port with leak detection equipment installed	
10 - Roof overview	

Description	File Attachment
11 - Fill port, normal vent, and visual level indicator	
12 - Bolted roof access hatch	
13 - Emergency vent	

Description	File Attachment
14 - Draw piping, return piping, and sensor port	
15 - Intact roof coating with bio staining	
16 - Typical condition of roof coating	

Description	File Attachment
17 - Fill ports located in truck containment berm	

STI SP001 Annual Inspection Checklist

General Inspection Information:

Inspection Date: 12-10-2019 Prior Inspection Date: _____ Retain until date: 12-10-2020

Inspector Name (print): Garth Lind Title: STI-SP001

Inspector's Signature: GLd

Tank(s) inspected ID Tank 4 ID 7-4843 | 2TB OSFM# 02065

Regulatory facility name and ID number (if applicable) Barnhardt Manufacturing Co Colrain, MA

Inspection Guidance:

- This checklist is intended as a model. Locally developed checklists are acceptable as long as they are substantially equivalent (as applicable).
- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector per paragraph 4.1.2 of the standard.
- Remove promptly standing water or liquid discovered in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility should regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for at least 36 months.
- Complete this checklist on an annual basis, supplemental to the owner monthly-performed inspection checklists.
- **Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.**

	ITEM	STATUS	COMMENTS / DATE CORRECTED
	Tank Foundation/Supports		
1	Free of tank settlement or foundation washout?	☑Yes ☐No	
2	Concrete pad or ring wall free of cracking and spalling?	☑Yes ☐No ☐N/A	

3	Tank supports in satisfactory condition?	☑Yes ☐No ☐N/A	
4	Is water able to drain away from tank if tank is resting on a foundation or on the ground?	☑Yes ☐No ☐N/A	
5	Is the grounding strap between the tank and foundation/supports in good condition?	☑Yes ☐No ☐N/A	
	Tank Shell, Heads and Roof		
6	Free of visible signs of coating failure?	☑Yes ☐No	
7	Free of noticeable distortions, buckling, denting, or bulging?	☑Yes ☐No	
8	Free of standing water on roof?	☑Yes ☐No ☐N/A	
9	Are all labels and tags intact and legible?	☑Yes ☐No	
	Tank Manways, Piping, and Equipment		
10	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	☑Yes ☐No ☐N/A	
	Tank Equipment		
11	Normal and emergency vents free of obstructions?	☑Yes ☐No	Clear snow to ensure proper function
12	Normal vent on tanks storing gasoline equipped with pressure/vacuum vent?	☐Yes ☐No ☑N/A	
13	Are flame arrestors free of corrosion and are air passages free of blockage?	☐Yes ☐No ☑N/A	
14	Is the emergency vent in good working condition and functional, as required by manufacturer? Consult manufacturer's requirements. Verify that components are moving freely (including long-bolt manways).	☑Yes ☐No ☐N/A	
15	Is interstitial leak detection equipment in good condition? Are windows on sight gauges clear? Are wire connections intact? If equipment has a test function, does it activate to confirm operation?"	☑Yes ☐No ☐N/A	

16	Are all valves free of leaks, corrosion and other damage? Follow manufacturers' instructions for regular maintenance of these items. Check the following and verify (as applicable): □ Anti-siphon valve □ Check valve □ Gate valve □ Pressure regulator valve □ Expansion relief valve □ Solenoid valve □ Fire valve □ Shear valve	☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A	
17	Are strainers and filters clean and in good condition?	☐Yes ☐No ☑N/A	
	Insulated Tanks		
18	Free of missing insulation? Insulation free of visible signs of damage? Insulation adequately protected from water intrusion?	☐Yes ☐No ☑N/A	
19	Insulation free of noticeable areas of moisture?	☐Yes ☐No ☑N/A	
20	Insulation free of mold?	☐Yes ☐No ☑N/A	
21	Free of visible signs of coating failure?	☐Yes ☐No ☑N/A	
	Tank / Piping Release Detection		
22	Is inventory control being performed and documented if required?	☑Yes ☐No ☐N/A	
23	Is release detection being performed and documented if required?	☑Yes ☐No ☐N/A	
	Other Equipment		
24	Are electrical wiring and boxes in good condition?	☑Yes ☐No ☐N/A	
25	Has the cathodic protection system on the tank been tested as required by the designing engineer?	☐Yes ☐No ☑N/A	

End Cap		Shell	
Readings		Readings	
1	0.240	1	0.175
2	0.240	2	0.175
3	0.240	3	0.175
4	0.240	4	0.175
5	0.235	4	0.175
6	0.240	6	0.175
7	0.235	7	0.175
8	0.240	8	0.175
Average	0.239	9	0.175
MIN	0.235	10	0.175
MAX	0.240	11	0.170
STD DEV	0.002	12	0.175
		13	0.175
		14	0.170
		15	0.170
		16	0.175
		Average	0.174
		MIN	0.170
		MAX	0.175
		STD DEV	0.002

CORRTECH
CORROSION UNDERSTOOD

FIELD REPORT

Date(s):	12-10-2019	**Field Report No.**	14228-FIR-05-1

Project / Report Title: **BMC – 10,000 Gallon Hydrogen Peroxide Storage Tank STI SP001 Inspection Report** **NDT and STI Inspection of 6 Tanks**	**Client:** **Omni Environmental Group, LLC** **6 Lancaster County Road** **Harvard, MA 01451**

Weather:	Overcast	**Temperature:**	40's

Background & Methods

CorrTech Inc. has performed an STI SP001 in service inspection of Barnhardt Manufacturing Company's one (1) 10,000 gallon Hydrogen Peroxide storage tank in Colrain, MA for the Omni Environmental Group, LLC. This inspection was performed on December 10, 2019 under CorrTech Job No. 14228.

This tank is a steel welded single wall AST with a capacity of 10,000 gallons and concrete secondary containment.

Inspection was performed in accordance with Steel Tank Institute (STI) Standard SP001, “Standard for the Inspection of Above Ground Storage Tanks.”

TEST PROCEDURES

The tank was not entered for internal inspection. All inspections, measurements and observations were performed on the exterior surfaces. Assessment of internal pitting activity was not performed.

Inspection for cracks, blisters, peeling, delamination’s and other anomalies was performed on external surfaces.

Visual examination of exposed piping, auxiliary equipment, joint welds and connections for misalignment and tightness were performed, pipe flanges were inspected for gasket deterioration and misalignment. This inspection considered tank systems attached to the tank.

This report presents all data obtained during the tank inspection, photographs of significance and other pertinent information. This report stated the condition of the tank with respect to UL-2085, STI SP001 and State regulations.

CorrTech inspection protocol employed sampling and testing procedures, with suitable and calibrated instrumentation, to provide the required information. The inspection team evaluated each structure. The standard protocol was followed, and additional analysis and sampling/testing procedures were utilized as determined in the field to ensure proper and adequate evaluation of the structures of interest.

Observations

CONTAINMENT
This tank is installed in a secondary concrete containment that measures 30-ft by 12-ft by 47-in for a total capacity of 10,434 gallons. The concrete pads for the tank saddles measure 110-in by 30-in by 18-in and take up an additional 763.4 gallons of capacity within the containment. This brings the total capacity of the containment to 9670.6

gallons. Standards require the capacity of the containment to be 110% the total volume of the tank. This would require the volume of the containment to be 11,000 gallons.

STRUCTURE
This tank is supported by three steel saddles that are anchored to concrete pads. Each saddle has four anchors that were all properly engaged. General corrosion and coating delamination was noted on the steel saddles, however there was no visible metal loss. The concrete pads were all free from significant cracking or spalling.

The tank is galvanized with no coating system. Minor bio staining has formed on the shell of the tank and areas of corrosion staining from old strapping material.

The welds of the shell were free from corrosion and visible stress.

There was no visible buckling or bowing in the end caps or shell of the tank.

NOZZLES

All tank nozzles and ports were free from excessive corrosion or visual leaks.

EQUIPMENT
The normal vent is free of obstructions
A level indicator is installed at the side of the tank as well as in the adjacent building.
Overfill alarms are installed on the tank.
There is no spill control around the fill port.
Grounding wire is free from corrosion.

ULTRA SONIC THICKNESS READINGS
Ultrasonic thickness readings were taken on the shell and heads of the tank to check for any metal loss on the interior of the tank, The average thickness for the heads was 0.275-in, the maximum reading was 0.280-in, the minimum reading was 0.260-in, and the standard deviation for the readings was 0.008-in. The shell thickness readings averaged 0.224-in, with a maximum reading of 0.225-in, a minimum reading 0.220-in, and the standard deviation of 0.002-in.

Conclusions & Recommendations

The Barnhardt Manufacturing Company 10,000 gallon Hydrogen Peroxide storage tank is fit for continued service but the containment volume is insufficient.

Without spill control and Continuous Release Detection Method (CRDM) in place on this AST it is designated as a Category 2 tank. A Category 2 tank with a capacity between 5,001 - 30,000 gallons requires periodic AST inspection (monthly or yearly) by the owner's inspector, a formal external inspection performed by a Certified Inspector in at least 10 years, and a formal internal inspection performed by a Certified Inspector every 20 years. Alternatively periodic inspections can be performed, a formal external inspection performed every 5 years, and a leak test performed every 10 years, per STI SP001 standards.

The containment is undersized and does not meet the 110% volume requirement. The containment wall height should be raised to create the necessary volume. Fixing the volume of the containment would change this tank to a Category 1.

Spill control should be installed around the fill port outside of the containment to catch any accidental release during filling.

Attachments	STI SP001 Annual Inspection Checklist Ultrasonic Thickness Data

Employee Name: Garth Lund	The above constitutes CorrTech's understanding of all items discussed and/or items noted.
Prepared By: CORRTECH, INC.  Garth Lund Project Engineer NACE CIP 2 STI SP001 Inspector CorrTech, Inc. 455 Main St. Bldg. 1 Suite A Deep River, CT 06417 Tel (860) 526-2610 Cell (860)304-8880 Fax (860) 526-5018 glund@corrtech-inc.com	All concerned parties shall review this report and comment within seven days if any of the items require clarification, correction, and/or require additional discussion.

RELATED FILES

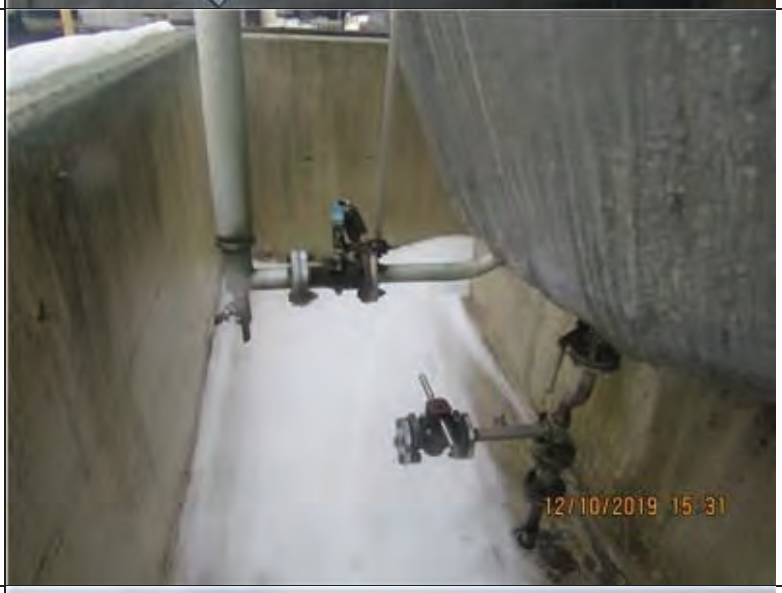
Description	File Attachment
01 - Tank overview	

Description	File Attachment
02 - Concrete containment wall	
03 - Concrete containment free from cracking and spalling	
04 - Concrete containment free from cracking and spalling	

Description	File Attachment
05 - Containment floor free from cracking or spalling	
06 - Containment drain with valve locked	
07 - Level indicator	

Description	File Attachment
08 - Steel tank saddle with concrete foundation	
09 - Corrosion on steel tank saddle	
10 - Concrete foundation free from cracking and spalling	

Description	File Attachment
11 - NFPA diamond and material labeling on tank	
12 - Typical condition of exterior tank shell	
13 - Normal vent	

Description	File Attachment
14 - Roof hatch	
15 - Draw pipe and tank sight glass	
16 - Corrosion staining from strapping material	

Description	File Attachment
17 - Fill port without spill control	
18 - Typical condition of tank head	
19 - Draw pipe	

STI SP001 Annual Inspection Checklist

General Inspection Information:

Inspection Date: 12-10-2019 Prior Inspection Date: _____ Retain until date: 12-10-2020

Inspector Name (print): Garth Lund Title: STI SP001 Inspector

Inspector's Signature: GTlund

Tank(s) inspected ID 10,000 Gallan Hydrogen Peroxide Tank

Regulatory facility name and ID number (if applicable) Barnhardt Manufacturing CO. Colrain, MA

Inspection Guidance:

- This checklist is intended as a model. Locally developed checklists are acceptable as long as they are substantially equivalent (as applicable).
- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector per paragraph 4.1.2 of the standard.
- Remove promptly standing water or liquid discovered in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility should regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for at least 36 months.
- Complete this checklist on an annual basis, supplemental to the owner monthly-performed inspection checklists.
- **Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.**

	ITEM	STATUS	COMMENTS / DATE CORRECTED
	Tank Foundation/Supports		
1	Free of tank settlement or foundation washout?	☑Yes ☐No	
2	Concrete pad or ring wall free of cracking and spalling?	☑Yes ☐No ☐N/A	

3	Tank supports in satisfactory condition?	☑Yes ☐No ☐N/A	
4	Is water able to drain away from tank if tank is resting on a foundation or on the ground?	☑Yes ☐No ☐N/A	
5	Is the grounding strap between the tank and foundation/supports in good condition?	☐Yes ☐No ☑N/A	
	Tank Shell, Heads and Roof		
6	Free of visible signs of coating failure?	☑Yes ☐No	
7	Free of noticeable distortions, buckling, denting, or bulging?	☑Yes ☐No	
8	Free of standing water on roof?	☑Yes ☐No ☐N/A	
9	Are all labels and tags intact and legible?	☑Yes ☐No	
	Tank Manways, Piping, and Equipment		
10	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	☑Yes ☐No ☐N/A	
	Tank Equipment		
11	Normal and emergency vents free of obstructions?	☑Yes ☐No	
12	Normal vent on tanks storing gasoline equipped with pressure/vacuum vent?	☐Yes ☐No ☑N/A	
13	Are flame arrestors free of corrosion and are air passages free of blockage?	☐Yes ☐No ☑N/A	
14	Is the emergency vent in good working condition and functional, as required by manufacturer? Consult manufacturer's requirements. Verify that components are moving freely (including long-bolt manways).	☐Yes ☐No ☑N/A	
15	Is interstitial leak detection equipment in good condition? Are windows on sight gauges clear? Are wire connections intact? If equipment has a test function, does it activate to confirm operation?"	☐Yes ☐No ☑N/A	

16	Are all valves free of leaks, corrosion and other damage? Follow manufacturers' instructions for regular maintenance of these items. Check the following and verify (as applicable): □ Anti-siphon valve □ Check valve □ Gate valve □ Pressure regulator valve □ Expansion relief valve □ Solenoid valve □ Fire valve □ Shear valve	☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☑Yes ☐No ☐N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A	
17	Are strainers and filters clean and in good condition?	☐Yes ☐No ☑N/A	
	Insulated Tanks		
18	Free of missing insulation? Insulation free of visible signs of damage? Insulation adequately protected from water intrusion?	☐Yes ☐No ☑N/A	
19	Insulation free of noticeable areas of moisture?	☐Yes ☐No ☑N/A	
20	Insulation free of mold?	☐Yes ☐No ☑N/A	
21	Free of visible signs of coating failure?	☐Yes ☐No ☑N/A	
	Tank / Piping Release Detection		
22	Is inventory control being performed and documented if required?	☑Yes ☐No ☐N/A	
23	Is release detection being performed and documented if required?	☑Yes ☐No ☐N/A	
	Other Equipment		
24	Are electrical wiring and boxes in good condition?	☐Yes ☐No ☑N/A	
25	Has the cathodic protection system on the tank been tested as required by the designing engineer?	☐Yes ☐No ☑N/A	

Additional Comments: Concrete containment is not ~~the~~ proper size

End Cap		Shell	
Readings		Readings	
1	0.260	1	0.225
2	0.260	2	0.225
3	0.260	3	0.225
4	0.260	4	0.225
5	0.280	4	0.225
6	0.265	6	0.220
7	0.275	7	0.225
8	0.275	8	0.225
Average	0.275	9	0.225
MIN	0.260	10	0.225
MAX	0.280	11	0.225
STD DEV	0.008	12	0.220
		13	0.225
		14	0.225
		15	0.225
		16	0.220
		Average	0.224
		MIN	0.220
		MAX	0.225
		STD DEV	0.002

CORRTECH
CORROSION UNDERSTOOD

FIELD REPORT

Date(s):	12-10-2019	**Field Report No.**	14228-FIR-06-1

Project / Report Title: **BMC – 500 Gallon No. 2 Fuel Oil Storage Tank STI SP001 Inspection Report** **NDT and STI Inspection of 6 Tanks**	**Client:** **Omni Environmental Group, LLC** **6 Lancaster County Road** **Harvard, MA 01451**

Weather:	Overcast	**Temperature:**	40's

Background & Methods

CorrTech Inc. has performed an STI SP001 in service inspection of Barnhardt Manufacturing Company's one (1) 500 gallon No. 2 Fuel Oil storage tank in Colrain, MA for the Omni Environmental Group, LLC. This inspection was performed on December 10, 2019 under CorrTech Job No. 14228.

This tank is a steel welded double walled AST with a capacity of 500 gallons.

Inspection was performed in accordance with Steel Tank Institute (STI) Standard SP001, “Standard for the Inspection of Above Ground Storage Tanks.”

TEST PROCEDURES

The tank was not entered for internal inspection. All inspections, measurements and observations were performed on the exterior surfaces. Assessment of internal pitting activity was not performed.

Inspection for cracks, blisters, peeling, delamination’s and other anomalies was performed on external surfaces.

Visual examination of exposed piping, auxiliary equipment, joint welds and connections for misalignment and tightness were performed, pipe flanges were inspected for gasket deterioration and misalignment. This inspection considered tank systems attached to the tank.

This report presents all data obtained during the tank inspection, photographs of significance and other pertinent information. This report stated the condition of the tank with respect to UL-2085, STI SP001 and State regulations.

CorrTech inspection protocol employed sampling and testing procedures, with suitable and calibrated instrumentation, to provide the required information. The inspection team evaluated each structure. The standard protocol was followed, and additional analysis and sampling/testing procedures were utilized as determined in the field to ensure proper and adequate evaluation of the structures of interest.

Observations

CONTAINMENT
500 gallon No. 2 Fuel Oil storage tank is a double walled AST. The interstitial space between the two walls provides the containment for the contents of the tank. A leak sensor is installed on the interstice viewing port however the sensor is not connected. When the sensor was removed fluid was noted 50% of the way up the viewing port. It

could not be determined whether the fluid was just outside water or had some oil in it.

STRUCTURE
This tank is supported by three steel saddles that are set on a concrete slab. The saddles are free from corrosion and metal loss. The concrete foundation slab shows no cracking or spalling.

There was no visible buckling or bulging noted on the exterior wall of the interstice.

NOZZLES

All tank nozzles and ports were free from excessive corrosion or visual leaks.

COATING
The exterior coating of the secondary wall is completely intact with no visual corrosion, coating loss, or adhesion loss.

EQUIPMENT
The normal vent is free of obstructions.
Both emergency vent moves freely and seats properly.
The interstitial leak detection alarm is not connected.
A level indicator is installed on the roof.
Overfill alarms are installed on the tank.
Spill control is in place around the fill ports.

ULTRA SONIC THICKNESS READINGS
Ultrasonic thickness readings were taken on the shell and heads of the tank to check for any metal loss on the interior of secondary wall of the tank, The average thickness for the heads was 0.129-in, the maximum reading was 0.130-in, the minimum reading was 0.125-in, and the standard deviation for the readings was 0.002-in. The shell thickness readings averaged 0.129-in, with a maximum reading of 0.130-in, a minimum reading 0.125, and the standard deviation of 0.002-in.

Based on the data gathered there does not appear to any metal loss on the interior of the secondary wall.

Conclusions & Recommendations

The Barnhardt Manufacturing Company 500 gallon No. 2 Fuel Oil storage tank is fit for continued service due to the integrity of the outer tank.

With the spill control and Continuous Release Detection Method (CRDM) in place on this AST it is designated as a Category 1 tank. A Category 1 tank with a capacity less than 1,100 gallons requires periodic AST inspection (monthly or yearly) by the owner's inspector, per STI SP001 standards.

The fluid in the interstice must be drained to identify if it is contaminated with oil. If oil is present a leak may have formed. If the inner tank is suspected to have a leak it should be air tested and repaired if possible. If the leak is present and the inner tank is not repaired it would be treated as a Class 2 tank and should be located inside a containment structure.

The interstice leak sensor should be connected or removed from the port to allow easier viewing of the interstice.

Attachments

STI SP001 Annual Checklist
Ultrasonic Thickness Data

Employee Name: Garth Lund **Prepared By:** CORRTECH, INC.  Garth Lund Project Engineer NACE CIP 2 STI SP001 Inspector CorrTech, Inc. 455 Main St. Bldg. 1 Suite A Deep River, CT 06417 Tel (860) 526-2610 Cell (860)304-8880 Fax (860) 526-5018 glund@corrtech-inc.com	The above constitutes CorrTech's understanding of all items discussed and/or items noted. All concerned parties shall review this report and comment within seven days if any of the items require clarification, correction, and/or require additional discussion.

RELATED FILES

Description	File Attachment
01 - Tank overview	

Description	File Attachment
02 - NFPA Fire diamond and material identification sign	
03 - Intact exterior coating system	
04 - Intact exterior coating	

Description	File Attachment
05 - UL manufacturing plate	
06 - Emergency vents installed on roof	
07 - Fill and return port	

Description	File Attachment
08 - Level indicator	
09 - Vertical pump	
10 - Fill pipe	

Description	File Attachment
11 - Tank saddles free from corrosion and metal loss	
12 - Fluid in interstice viewing port	

STI SP001 Annual Inspection Checklist

General Inspection Information:

Inspection Date: 12-10-2019 Prior Inspection Date: _____ Retain until date: 12-10-2020

Inspector Name (print): Garth Lund Title: STI SP001 Inspector

Inspector's Signature: GLel

Tank(s) inspected ID 500 Gallon No 2 Fuel oil Tank

Regulatory facility name and ID number (if applicable) Barnhardt Manufacturing Co. Colrain, MA

Inspection Guidance:

- This checklist is intended as a model. Locally developed checklists are acceptable as long as they are substantially equivalent (as applicable).
- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector per paragraph 4.1.2 of the standard.
- Remove promptly standing water or liquid discovered in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility should regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for at least 36 months.
- Complete this checklist on an annual basis, supplemental to the owner monthly-performed inspection checklists.
- **Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.**

	ITEM	STATUS	COMMENTS / DATE CORRECTED
	Tank Foundation/Supports		
1	Free of tank settlement or foundation washout?	☑Yes ☐No	
2	Concrete pad or ring wall free of cracking and spalling?	☑Yes ☐No ☐N/A	

3	Tank supports in satisfactory condition?	☑Yes ☐No ☐N/A	
4	Is water able to drain away from tank if tank is resting on a foundation or on the ground?	☐Yes ☑No ☐N/A	Containment curb around tank will keep water in contact with saddles
5	Is the grounding strap between the tank and foundation/supports in good condition?	☐Yes ☐No ☑N/A	
	Tank Shell, Heads and Roof		
6	Free of visible signs of coating failure?	☑Yes ☐No	
7	Free of noticeable distortions, buckling, denting, or bulging?	☑Yes ☐No	
8	Free of standing water on roof?	☑Yes ☐No ☐N/A	
9	Are all labels and tags intact and legible?	☑Yes ☐No	
	Tank Manways, Piping, and Equipment		
10	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	☑Yes ☐No ☐N/A	
	Tank Equipment		
11	Normal and emergency vents free of obstructions?	☑Yes ☐No	
12	Normal vent on tanks storing gasoline equipped with pressure/vacuum vent?	☐Yes ☐No ☑N/A	
13	Are flame arrestors free of corrosion and are air passages free of blockage?	☐Yes ☐No ☑N/A	
14	Is the emergency vent in good working condition and functional, as required by manufacturer? Consult manufacturer's requirements. Verify that components are moving freely (including long-bolt manways).	☑Yes ☐No ☐N/A	
15	Is interstitial leak detection equipment in good condition? Are windows on sight gauges clear? Are wire connections intact? If equipment has a test function, does it activate to confirm operation?"	☐Yes ☑No ☐N/A	leak senson not connected fluid in interstic

16	Are all valves free of leaks, corrosion and other damage? Follow manufacturers' instructions for regular maintenance of these items. Check the following and verify (as applicable): □ Anti-siphon valve □ Check valve □ Gate valve □ Pressure regulator valve □ Expansion relief valve □ Solenoid valve □ Fire valve □ Shear valve	☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A ☐Yes ☐No ☑N/A	
17	Are strainers and filters clean and in good condition?	☐Yes ☐No ☑N/A	
	Insulated Tanks		
18	Free of missing insulation? Insulation free of visible signs of damage? Insulation adequately protected from water intrusion?	☐Yes ☐No ☑N/A	
19	Insulation free of noticeable areas of moisture?	☐Yes ☐No ☑N/A	
20	Insulation free of mold?	☐Yes ☐No ☑N/A	
21	Free of visible signs of coating failure?	☐Yes ☐No ☑N/A	
	Tank / Piping Release Detection		
22	Is inventory control being performed and documented if required?	☑Yes ☐No ☐N/A	
23	Is release detection being performed and documented if required?	☑Yes ☐No ☐N/A	
	Other Equipment		
24	Are electrical wiring and boxes in good condition?	☐Yes ☐No ☑N/A	
25	Has the cathodic protection system on the tank been tested as required by the designing engineer?	☐Yes ☐No ☑N/A	

Additional Comments: Fluid ½ way up interstice port
concrete curb with trap water around steel tank saddles

Heads		Shell	
Readings		Readings	
1	0.130	1	0.130
2	0.130	2	0.130
3	0.130	3	0.130
4	0.130	4	0.130
5	0.125	4	0.125
6	0.130	6	0.130
7	0.125	7	0.130
8	0.130	8	0.130
Average	0.129	Average	0.129
MIN	0.125	MIN	0.125
MAX	0.130	MAX	0.130
STD DEV	0.002	STD DEV	0.002

APPENDIX F
STATEMENT FROM APPLIED TECHNOLOGY AND ENGINEERING P.C.

Single Basin Operation and WWTP Performance

Based on the O&M manual, the Wastewater Treatment Plant average design flow capacity is 1.3 mgd. However, the plant is currently operating at only 25% of its capacity with an average flow of 0.33 mgd. The volume of each aeration basin is around 1.65 MG providing an average hydraulic retention time (HRT) of 10 days with both basins in service. The typical HRT for textile WWTP, using the extended aeration process, is 2 days or less. Due to the high HRT, when operating at a solids retention time (SRT) of around 30+ days, the current organic loadings are not sufficient to maintain a mixed liquor suspended solids (MLSS) concentration above 2,000 mg/L. The SRT is the main process control variable that maintains the food to mass ratio (F:M) for the system. This controls the solid production rate or sludge yield. For a given organic loading, the SRT and F:M control the amount of sludge produced and the mass of sludge in the system. Since the mass of sludge in the system is controlled by the SRT, the biomass concentration or MLSS is proportional to the volume of the system which includes the volume of the aeration basins and clarifiers in operation. Thus, the excessive volume of the system with both aeration basins in operation results in dilution of the sludge mass and low MLSS concentrations. Operating at MLSS concentrations below 2,000 mg/L are of concern with respect to poor bio-flocculation and increased levels of dispersed solids in the clarifier effluent. Given the excessive HRT with both basins in operation, the South Aeration Basin was taken out of service on 8/27/2018 in an effort to increase the MLSS concentration above 2000 mg/L and to enhance solids flocculation and settleability.

The process performance with respect to COD and BOD removal is controlled by the SRT. At a given SRT, the system is expected to operate similarly at different HRT values. The MLSS concentration for a given SRT and F:M will be proportional to the HRT. Thus, reducing the volume of the system by 50% will double the MLSS concentration at a given SRT. Using SRT process control, the minimum HRT is largely determined by the MLSS concentration and the resulting clarifier solids loading capacity. The allowable solids loading is a function of the settleability of the sludge which establishes the clarifier sludge flux rate (lbs/ft^2/hour). The flux rate varies based on the sludge characteristic and typically ranges between 0.2 and 1.0 lbs/ft^2/hour. Assuming clarifier solids loading rate of 0.5 lbs/ft^2/hour and the existing clarifier surface area of 2,500 ft^2, the allowable solids loading rate for the clarifiers is around 30,000 lbs/day. At the current average flow, this would be equivalent to a MLSS concentration of over 10,000 mg/L. This is well above the current average MLSS concentration of 1,400 mg/L. Thus, operating at a reduce HRT has not resulted in excessive clarifier solids loading.

While the minimum MLSS in not typically a design consideration, the target MLSS is usually between 2,000 and 5,000 mg/L for extended aeration systems. Over the last 12 months, the WWTP has operated with an average SRT of 35 days and a F:M (based on BOD_5) of 0.06. The SRT is relatively high but was targeted to increase the mass of solids in the system and to maintain a high organic removal efficiency. The F:M was low but was within the typical range for extended aeration of 0.04 to 0.1 and would be expected at the high SRT. As noted above, the current MLSS concentration averaged 1400 mg/L operating with only one aeration basin under current flow and loading conditions. If the system were being operated with two aeration basins in service, the MLSS would be diluted to 823 mg/L. Thus, operations with only one aeration basin does not detrimentally affect the biomass concentration and the higher MLSS should provide improved flocculation and lower dispersed solids in the effluent.

The table below summarizes operating performance for the previous 12 months. The effluent COD averaged 202 mg/L with the effluent BOD_5 averaging 5 mg/L. Removal efficiencies for COD and BOD were 88% and 99%, respectively. Comparison of the effluent COD and BOD_5 concentrations indicates that biodegradable material was removed with a non-biodegradable fraction, represented by the effluent soluble COD, averaging 192 mg/L. The effluent TSS averaged 19 mg/L. These values indicate that the WWTP operated at a high efficiency level with respect to removal of biodegradable materials.

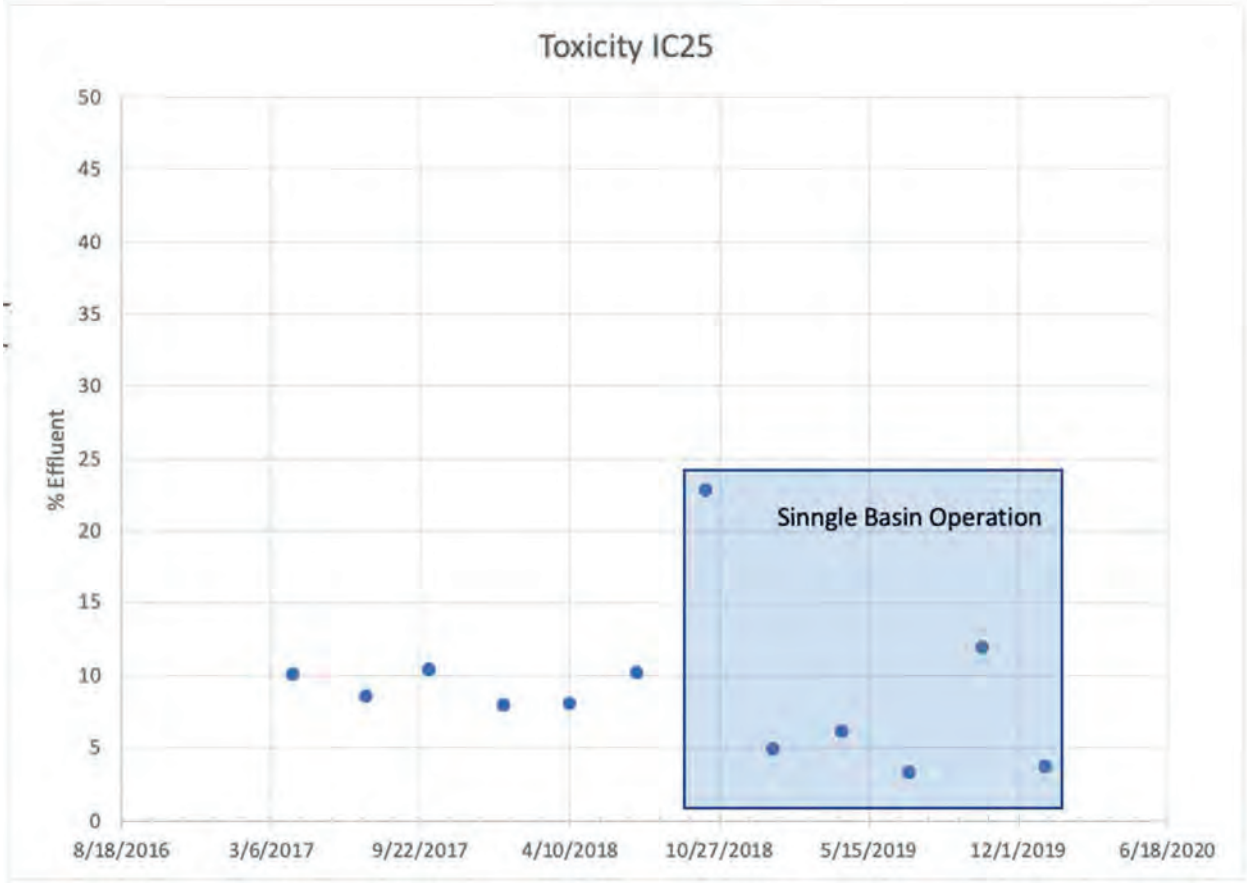
Summary of Average Values for Operating Parameter for the period of 4/16/2019 through 4/15/2020		
Parameter	**Units**	**Value**
Flow	mgd	0.33
COD	mg/L	1734
COD	lbs/d	4175
Eff. COD	mg/L	202
Eff. Soluble COD	mg/L	192
Eff. COD	lbs/d	498
COD Removal	%	88%
BOD	mg/L	416
BOD	lbs/d	1157
Eff. BOD	mg/L	5
Eff. BOD	lbs/d	16
BOS Removal	%	99%
Eff. TSS	mg/L	19
MLSS	mg/L	1469
MLVSS	mg/L	1256
HRT, Aeration Basin	days	5.0
SRT	days	35

Summary of Average Values for Operating Parameter for the period of 4/16/2019 through 4/15/2020		
Parameter	**Units**	**Value**
F:M COD		0.19
F:M BOD		0.06

The current chronic no observed toxicity limit (NOEC) is ≥ 5% and will increase to ≥ 7.2% in 2021. For comparison purposes, the IC_{25} values for the 6 quarters prior to operating with a single basin and the six quarters after are shown in the figure below. Based on a T.Test analysis of the data, there was no significant difference in the mean IC_{25} concentrations before and after changing the system to operate in a single aeration basin (p = 0.90).

While statistically there is no significant differences, comparison is difficult due to the limited number of samples. In addition, many variables other that the number of aeration basins in operation may have affected the toxicity. These variables include flow, chemicals and procedures used in manufacturing, and cotton characteristics.

WWTP Effluent IC_{25} Values before and during Single Aeration Basin Operation



Toxicity is an on-going concern for BMC and testing is being performed in an effort to identify the cause. Chronic toxicity tests were performed in December 2019 following various treatments to identify the class of contaminants contributing to the observed effluent toxicity. The treatments provided were:

1. Filtration with 0.45micron (µm) filter to remove colloidal materials;

2. Ethylenediaminetetraacetic acid (EDTA) treatment to chelate copper and other metals;

3. Activated carbon treatment to remove organics and other adsorbable material; and

4. Chemical coagulation to remove organics and colloidal materials.

The preliminary findings after use of these treatments did not suggest any significant improvement in acute or chronic toxicity. This indicates that carbon adsorbable organics, metals or colloidal materials are not major contributors to the observed toxicity. It is noted that the chemical oxygen demand (COD) following chemical treatment and carbon adsorption at a dosage of 2,000 milligrams per liter (mg/L) remained around 100 mg/L. Thus, a significant amount of organics remained in solution. These organics may be associated with toxicants and the possibility that trace level toxicants are present is being investigated.

Additionally, chemicals used in BMC's manufacturing processes have been evaluated. One of the scouring agents historically used by BMC has a comparatively high concentration of aromatic organic compounds. BMC has replaced this chemical with an alternative having a lower concentration of aromatic compounds. The wastewater treatment plant effluent toxicity will be evaluated to determine if this change improves the effluent toxicity following an appropriate acclimation period.

Another area of investigation relates to the combined effects of low hardness and high total dissolved solids (TDS) on toxicity. It has been shown that under low hardness conditions, salts, such as sodium chloride and sodium sulfate, can be toxic to macroinvertebrates such as *Ceriodaphnia dubia* at relatively low concentrations. The hardness of the North River water, which is used for toxicity test dilution water, is typically around 30 mg/L and the TDS of the effluent averages around 1,500 mg/L. Thus, the low river water hardness and high wastewater salt concentrations may be contributing to the toxicity, especially at high effluent concentrations. Testing is being performed to determine if toxicity improves with the addition of calcium to increase the hardness. If so, the ionic constituents in the wastewater will be determined and testing of synthetic wastewater with a similar ionic balance may be tested to confirm toxicity associated with inorganic constituents.

It is concluded than the modification to the flow regime to provide singly basin operation was made to enhance performance and there is no indication that operating with one aeration basin significantly affected the WWTP performance with respect to compliance with the discharge permit.

With respect to 314 CMR 12.03(2), BMC did not consider the change in the flow regime to be a major physical modification. No physical equipment or piping changes were made and the use of one basin was accomplished using existing capabilities in place prior to the change. The activated sludge process accomplished through the use of the aeration basin continued to be used and the unit process was not by-passed. Further, it was not anticipated or subsequentially indicated that the change significantly affected the treatment efficiency.

314 CMR 12.03(7) states that "No person responsible for the operation of treatment works shall permit wastes to bypass the wastewater treatment facility or any portion, unit or part thereof in violation of a discharge permit, except when approved by the Department due to design limitations." Since no unit processes were by-passed, BMC did not consider that the change was in violation of the discharge permit or that this requirement was applicable.

The WWTP was properly operated and maintained as required by Part II.B.1. In addition, as indicated by the permit Part II.D.1.a(2), notice is only required when "The alteration or addition could significantly change the nature or increase the quantities of the pollutants discharged." BMC did not anticipate that this would occur.

It is acknowledged that neither the O&M Manual nor the BMP specifically describe WWTP operation utilizing only one aeration basin. These documents will be modified accordingly.

APPENDIX G
BASIS OF DESIGN SULFURIC ACID SYSTEM UPGRADE

ROBERT MITCHELL
ENGINEERING, P.C.

November 20, 2019

Barnhardt Manufacturing Company
Attention: Mark Thibodeau
247 Main Road, Colrain, MA 01340

Attn: Mr. Mark Thibodeau, Maintenance Manager

Re: Basis of Design, Sulfuric Acid System Upgrade
Proj. No. 19003

Dear Mark:

I am providing the attached basis of design report for your review and comment. The intent of this report it outline the scope and project execution plan for the upgrade to the sulfuric acid storage and delivery systems at Barnhardt Manufacturing Company's Colrain, MA facility.

After a leak from the remote, bulk storage tank at the Colrain facility, investigations from the Massachusetts DEP, EPA, as well as internal investigations, have led to a conclusion that the legacy sulfuric acid system posed both environmental and safety concerns.

In general, Barnhardt Manufacturing uses sulfuric acid in two (2) locations: bleaching and screening (waste water treatment). Although usage is dependent on variable plant capacity, both systems will be designed for approximately 50 to 100 gallons per week. The concept design provided within this basis of design report provides solutions for both spill containment as well as minimizing the risk of reactions from incompatible materials. The design focusses on the use of local double wall tanks in the two (2) areas where sulfuric acid is used.

The project can be completed in approximately 3 months after this concept is approved by Barnhardt Manufacturing. Schedule and cost details will be provided as soon as possible after approval. At this time, the intent is that Robert Mitchell Engineering, PC will be the program manager for the engineering, bidding, and construction phases of this project. I, Robert Mitchell, am a licensed professional engineer in the state of Massachusetts for chemical engineering. As such all engineering design will be performed under the direction of Robert Mitchell Engineering, PC.

Should there be any questions, please feel free to reach out to me.

Sincerely,

Robert Mitchell, PE
President

7 Douglas Ln
Plymouth, MA 02360
T 617 908 9230
rcmitch2@gmail.com

ROBERT MITCHELL
ENGINEERING, P.C.

Basis of Design

Barnhardt Manufacturing Company
Colrain, MA

Sulfuric Acid System Upgrade

Description	Rev	Date
Issued for Review & Comment	**A**	**19Nov2019**

TABLE OF CONTENTS

T 617 908 9230
rcmitch2@gmail.com

1.0 Overview

1.1 Introduction

The intent of this report it outline the scope and project execution plan for the upgrade to the sulfuric acid storage and delivery systems at Barnhardt Manufacturing Company's Colrain, MA facility.

After a leak from the remote, bulk storage tank at the Colrain facility, investigations from the Massachusetts DEP, EPA, as well as internal investigations have led to a conclusion that the legacy sulfuric acid system posed both environmental and safety concerns.

Barnhardt Manufacturing contacted Robert Mitchell Engineering, PC to provide professional engineering support to improve the installation to meet both current code and best practice.

In general, Barnhardt Manufacturing uses sulfuric acid in two (2) locations: bleaching and screening (waste water treatment). Although usage is dependent on plant capacity, both systems will be designed for approximately 50 to 100 gallons per week.

1.2 Executive Summary

A concept design is presented within this basis of design report. The design focusses on the use of local double wall tanks in the two (2) areas where sulfuric acid is used.

The project can be completed in approximately 3 months after this concept is approved by Barnhardt Manufacturing. Schedule and cost details will be provided as soon as possible after release to proceed.

2.0 Scope

2.1 Design Overview

The intent of the new design is to replace the legacy central sulfuric acid storage and provide separate, local storage in both the screening and bleaching areas. Since the central storage tank has already been removed, the project is limited to upgrading the local storage locations.

Each local system will use a polyethylene, double wall storage tank with level monitoring through the site control system. All connections on the double wall tank will be on top to eliminate the possibility of leaks from the tank.

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The tank will be filled from a portable tote provided by the sulfuric acid vendor. The tote will be delivered to the site, immediately moved to a designated location adjacent to the double wall tank, and the acid will be pumped from the tote into the storage tank. There will be a fixed transfer pump at the storage tank. The hose connecting the tote to the pump will be abrasive resistant and will include a Kamlock type hose connection with a close coupled ball valve to minimize any leakage during disconnect from the tote.

Sulfuric acid delivery to the process will be via a pump mounted on the top of the tank.

A preliminary P&ID for the bleaching area is included in this report for clarity. The design will be similar for the screening area although the process pump will be a 4-20 ma controlled metering pump rather than the diaphragm pump used in the bleaching area. Upon approval of the concept, additional details will be provided in detail design.

2.2 Equipment Description

Major components of the new installation are described in this section and supporting vendor information is included in the appendix.

The storage tanks will be a double wall crosslinked polyethylene tank manufactured by Assmann. The tank capacity is 405 gallons. All connections to the vessel will be on top of the tank.

A Kobold ultrasonic level transmitter will be provided so that the level can be remotely monitored and alarmed through the existing central control system.

ARO diaphragm pumps will be used for both transfer from the tote to double wall storage tanks as well as delivery to the process for bleaching. Wetted parts on the pump shall be PVDF.

The hose used for connecting the supply tote to the transfer pump will be an abrasive resistant nitrile rubber covered viton. The end connection will be designed to mate with the tote, which has a combination ball valve/male hose coupling, designed for minimal leakage when disconnecting the hose.

Preferred materials for concentrated sulfuric acid include Alloy 20 for piping, fluoropolymer tubing (PTFE, PVDF, etc) and viton for elastomer. Polypropylene is marginally acceptable but may be required for the hose connection. EPDM and stainless steel are not recommended. All new materials will follow these guidelines.

2.3 Operation/Maintenance

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ROBERT MITCHELL
ENGINEERING, P.C.

Actual standard operating procedures (SOP's) and maintenance requirements will be the responsibility of the Barnhard Manufacturing staff. Following, however, is a broad overview of the intent given the engineering design concept.

Delivery of sulfuric acid will be via a tote with capacity less than the double wall tank. The full tote will be immediately delivered from the dock to the local storage tank and then pumped dry. Personnel will always be present during the tote during transit and pumping such that any incident would be dealt with real time.

Maintenance needs to be codified such that routine inspections are scheduled and documented. Maintenance intervals should include inspections 1) during tote delivery, and 2) monthly or quarterly for routine visual checks. Intervals for replacement of gaskets and hoses need to be determined.

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rcmitch2@gmail.com

3.0 Project Execution

3.1 Project Approach

The intent is that Robert Mitchell Engineering, PC will be the program manager for the engineering, bidding, and construction phases of this project. Robert Mitchell is a licensed professional engineer in the state of Massachusetts for chemical engineering. As such all engineering design will be performed under the direction of Robert Mitchell Engineering, PC.

Major component specification and bidding will be provided by Robert Mitchell Engineering, PC. Procurement and installation will be performed by a mechanical contractor with capabilities in rigging and pipe installation. In-house electrical/instrumentation capabilities will be responsible for the final connections and configuration of the level transmitter.

Barnhardt Manufacturing will be responsible for review and approval of the design and provide safe access during installation. Coordination between the mechanical contractor and Barnhardt Manufacturing during installation will be key in-that impact to ongoing operations should be minimized. Safety hazards during this construction phase will need to be reviewed and mitigated.

3.2 Cost/Schedule

The detailed schedule is not yet included in this report. In general, the project can proceed, without delay, once Barnhardt Manufacturing approves the concept and is assured that it satisfies the requirements of the DEP and EPA. Major milestones, including detail design, purchasing, final cost estimate, mechanical installation, and startup will be provided soon after the project is approved. Note that a preliminary quote for the vessel shows a 4 to 6 week lead time after drawing approval. Given the critical path of the equipment, the overall project should be able to be completed in approximately 3 months.

Although the preliminary material costs for the major component have been received for planning purposes, the other major costs, including the mechanical installation, have not yet been estimated. Final pricing for the installation will be provided after detail design and procurement.

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4.0 Appendix

4.1 P&ID

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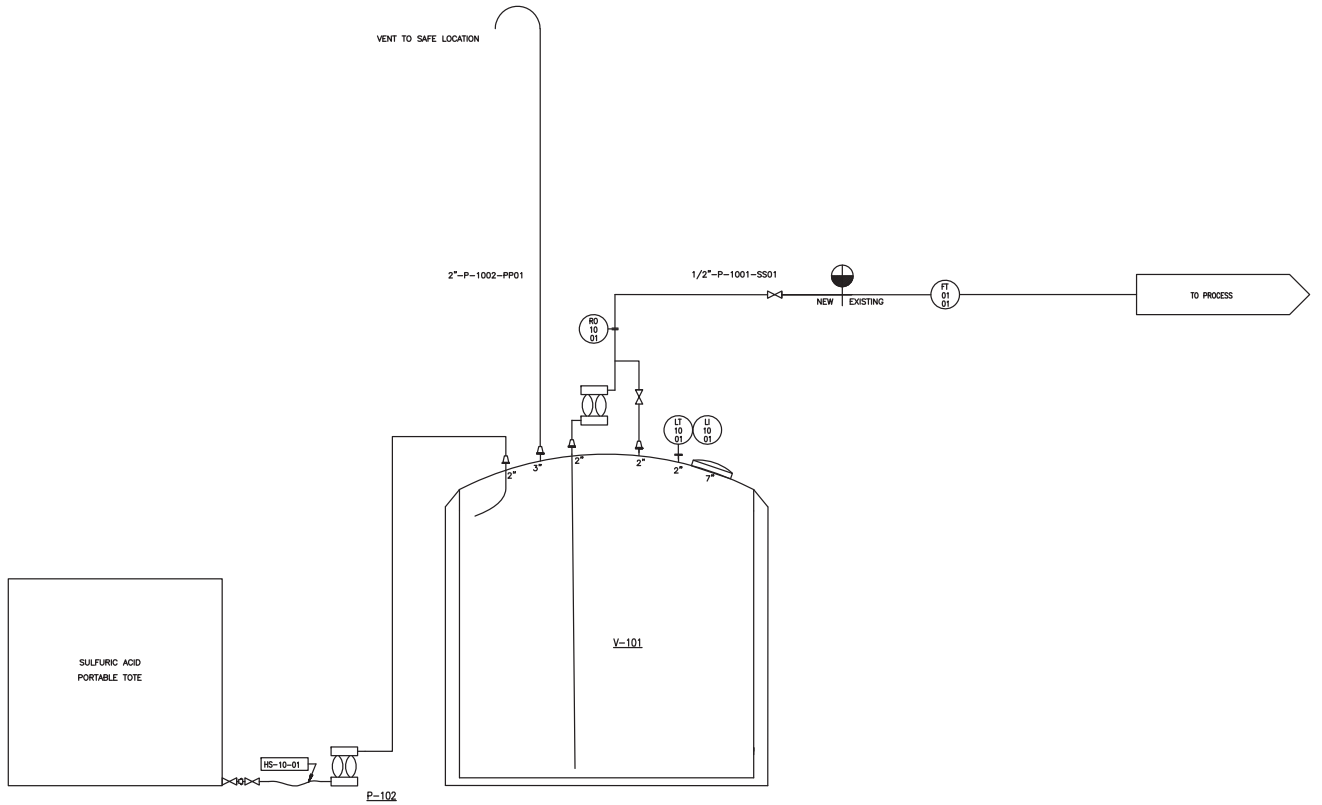

EQUIPMENT No.	V-101	P-101	P-102
EQUIPMENT NAME	SULFURIC ACID STORAGE TANK	SULFURIC ACID FEED PUMP	SULFURIC ACID TOTE PUMP
VENDOR	ASSMANN	ARO	ARO
MODEL	IMT405	PD05P-XXS-XXX-B	PD05P-XXS-XXX-B
CAPACITY	405 GAL	VARIABLE SPEED	VARIABLE SPEED
RATING	ATM		
MATERIAL	CROSS LINKED POLYETHYLENE	PVDF	PVDF
ELECTRICAL HP		COMPRESSED AIR	COMPRESSED AIR

Robert Mitchell Engineering P.C.
RCMITCH2@GMAIL.COM

REVISION	DATE	DESCRIPTION
A	19NOV2019	FOR REVIEW AND APPROVAL

CLIENT: BARNHARDT MANUFACTURING

PROJECT TITLE: NATURAL FIBERS GROUP COLRAIN, MA

DRAWING TITLE: SULFURIC ACID DELIVERY

LAST MODIFICATION: NA	ARCHITECT	ENGINEERING
DATE: 19NOV2019	ENGINEER: RSM	PROJECT MANAGER
SCALE: NO SCALE	DRAWN BY	CLIENT

QC REVIEW

RECORDS CONTROL
CLIENT PROJECT NO.
PROJECT NO.: 19003
CAD FILE NAME: 19003 PID-10AREV A.DWG

DRAWING NO.: PID-10

C:\USERS\ASDF\DACUMENTS\MITCHELL PC\MITCHELL PC PROJECTS\NOTCH\BARNHARDT

ROBERT MITCHELL
ENGINEERING, P.C.

4.2 Major Component Details

T 617 908 9230
rcmitch2@gmail.com

Small Double Wall Tanks

This system consists of a primary inner tank and secondary containment, with a capacity of 120% of the inner tank, exceeding EPA standards and complies with 40 CFR-264.193.

- Inner tank dome overlaps outer tank sidewall to help prevent rainwater, snow, and debris from entering secondary containment, making system ideal for outdoor storage of chemicals.
- Molded 7" threaded top access opening is standard. This access opening is chemically resistant and fume tight. Larger access openings available.
- Small footprints of 34½" & under will fit through standard 36" doorway to allow convenient system location within tight manufacturing areas.
- Molded in pump shelf is ideal for installing chemical pumps and metering equipment. This pump shelf is recessed in the top of the tank to contain small chemical spills.
- Recessed lower fitting flat will allow fittings to penetrate through the secondary containment wall and into the primary tanks sump. This feature allows full flooded suction for outlet assemblies.
- Interstitial leak detection systems option available.

Inner tank dome overlaps outer tank to prevent contamination.

Molded in pump shelf is recessed in the top of the tank. Shown w/optional metering pump.

Molded in sump in the primary tank is located directly below the pump shelf. Suction lines can be lowered onto the sump area, which will allow for maximum drainage of chemical with top discharge assemblies.

Model Number	Cap. (US Gals)	Dimensions (inches)		Weight (lbs) Linear Polyethylene						Weight (lbs) Crosslink Polyethylene						Access Open. (in)
				Primary Sp.Gravity			Secondary Sp. Gravity			Primary Sp. Gravity			Secondary Sp. Gravity			
		Dia.	Hgt.	1.5	1.9	2.2	1.5	1.9	2.2	1.5	1.9	2.2	1.5	1.9	2.2	
IMT 20	20	26⅛	21 ⅜	N/A	17	N/A	N/A	17	N/A	N/A	17	N/A	N/A	17	N/A	7
IMT 40	40	26 ⅛	33 ½	N/A	26	N/A	N/A	26	N/A	N/A	26	N/A	N/A	26	N/A	7
IMT 65	65	26 ⅛	47 ¾	N/A	36	N/A	N/A	36	N/A	N/A	36	N/A	N/A	36	N/A	7
IMT 85	85	34 ½	38 ½	N/A	45	N/A	N/A	45	N/A	N/A	45	N/A	N/A	45	N/A	7
IMT 120	120	34 ½	51	N/A	56	N/A	N/A	56	N/A	N/A	56	N/A	N/A	56	N/A	7
IMT 150	150	47	44	N/A	65	N/A	N/A	65	N/A	N/A	65	N/A	N/A	65	N/A	7/16
IMT 165	165	34 ½	66	N/A	69	N/A	N/A	69	N/A	N/A	69	N/A	N/A	69	N/A	7
IMT 250	250	47	61	N/A	95	N/A	N/A	95	N/A	N/A	95	N/A	N/A	95	N/A	7/16
IMT 405	405	47	76	N/A	74	82	N/A	77	90	N/A	74	77	N/A	77	82	7/16

Model number availability and individual specifications subject to change without notice.
Gallonage and weights are approximate. All wall thicknesses conform to ASTM D-1998.

Assmann Corporation of America

Phone: 888-357-3181 • Fax: 888-Tank Fax (826-5329)
Phone: 260-357-3181 • Fax: 260-357-3738
E-mail: info@assmann-usa.com • www.assmann-usa.com

Ultrasonic Level Transmitter

for Liquids

measuring • monitoring • analyzing

NUS-7

HART COMMUNICATION FOUNDATION

- Measuring Range: Liquids up to 20 Feet
- Accuracy:
  ±0.2% of Reading
  +0.05% of Full Scale
- Material: PP or PVDF
- p_{max}: 40 PSIG
- t_{max}: 176 °F
- Connection: 2" NPT, G2
- Output: 4-20 mA, HART®, Relay

KOBOLD companies worldwide:

ARGENTINA, AUSTRALIA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHILE, CHINA, COLOMBIA, CZECH REPUBLIC, EGYPT, FRANCE, GERMANY, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, REPUBLIC OF KOREA, ROMANIA, SINGAPORE, SPAIN, SWITZERLAND, TAIWAN, THAILAND, TUNISIA, TURKEY, UNITED KINGDOM, USA, VIETNAM

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Pittsburgh, PA 15205
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1.800.998.1020
1.412.788.4890
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www.koboldusa.com

01/07-21-2017

Description

The NUS-7 is a rugged, intelligent, high performance ultrasonic level transmitter, with both transducer and processing electronics incorporated into a single housing. The economical NUS-7 has all the sophisticated echo detection features of our proven NUS-4 measurement systems, packaged into the 2 wire NUS-7 sensor housing. 2-wire transmitters are recommended for applications powered by DC and for low switching capability. They excel in multiple tank applications using HART® multi-drop systems linked to a modem plus PC. The NUS-7 comes standard with HART® protocol. NUS-7 transmitters can provide the answer for level measurement in sumps and tanks or open channel flow measurement, It is suited for most liquids under various process conditions. It comes with scalable 4-20 mA output and programmable relay.

Programmable Features

- Relay Functions (Differential, Flow Pulse, etc.)
- Measurement Configuration (Units, Function, Close-end Blocking)
- Measurement Optimization (Damping, Tracking Speed, Sound Velocity Correction, etc.)
- Tank Contents Profiles: 14 Different Shapes
- Open Channel Flow Metering: 21 Different Profiles
- 32 Point Linearization, Measurement Simulation
- Information/Diagnostics (Echo Map and Signal/Noise)

Technical Data

Measuring Range: 0.8…20 feet[1] (0.25…6 meters)

Total Beam Angle: 5°

Ambient Temp: -22…176 °F (-30…80 °C)

Process Pressure Abs.: 7.5…40 PSIG (3…30 bar)

Process Connection: 2" NPT or G2

Materials:

Housing: PP or PVDF

Transducer: PP or PVDF

Cable Sealing: EPDM

Cable Isolation: PVC

Accuracy[1]: ± 0.2% of measured distance +0.05% of range

Resolution (Dep. on Distance): < 6.5 feet (2 m): 0.04" (1 mm); 6.5…16.5 feet (2…5) m: 0.075 inch (2 mm); 16.5…33 feet (5…10 m): 0.2" (5 mm)

Ingress Protection: IP68

Outputs 2-wire: Standard: 4-20 mA + HART®, max. 600 Ω, relay (SPDT, 30 V/ 1 A DC; 48 V/0.5 A AC)

Power Supply 2-wire: 12…36 V_{DC}/44…800 mW

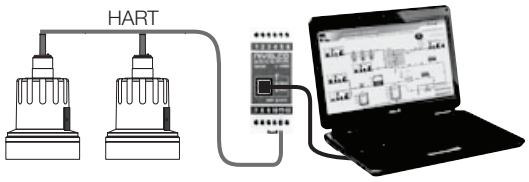
Connection Cable 2-wire: LIYCY type 2x0.5 mm^2 (AWG 20) shielded cable, Ø0.25 inch (6 mm); standard length 16.5 feet (5 m) can be ordered max. 100 feet (30 m)

[1] Under optimal circumstances of reflection and stabilized transducer temperature

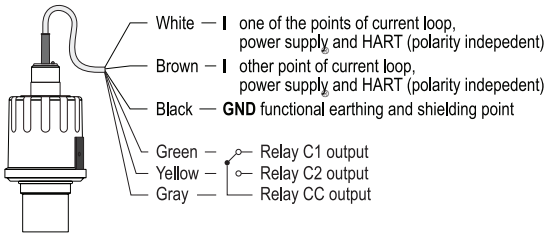
NUS-7 in Systems with PC

Using a PC and a HART® modem (e.g. model HARTCOMM), it is possible to create your own multi-drop HART® network, where the PC displays all NUS-7 measurement data and also allows reprogramming of the units as necessary. The outputs derived from the displayed data can be programmed via the PC, which acts as the master. A maximum of 15 transmitters can be connected to one HART® modem and KOBOLD's NUS-NTB-NRM-SW software can be used for configuration.

Multichannel Application with HART® Modem and PC



Wiring of the 2-wire NUS-7



Order Details (Example: NUS-7 0 06 R9 3 4H 5)

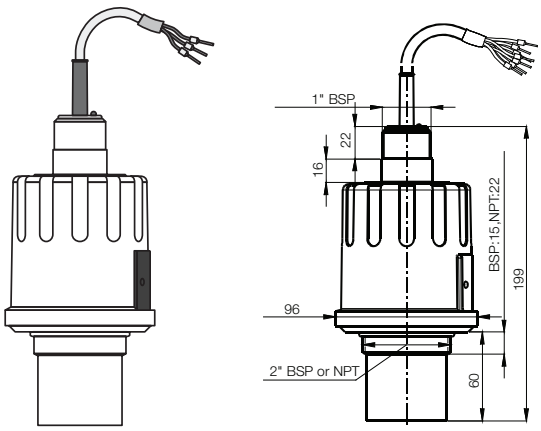
Model	Sensor/Housing Material	Range	Connection	Power Supply	Output	Cable Length
NUS-7..	**..0..** = PP (Standard) **..9..** = PVDF	**..06..** = 0.8...20 feet	**..N9..** = 2" NPT **..R9..** = G 2	**..3..** = 12-36 VDC	**..4H..** = 4-20 mA + HART® **..RH..** = 4-20 mA + Relay + HART®	**..5** = 16.5' (Standard) **..EC** = Custom Cable Length, Max. 100', custom length to be specified on your order

Order Code HART® Modem: HARTCOMM

Download NUS-NTB-NRM-SW Configuration Software at www.kobold.com)

Dimensions (mm)

NUS-7 Level Transmitter for Liquids - 2-wire Series



1/2" Non-Metallic Models

COMPACT SERIES PUMPS

Part of our Compact Series of pumps, our 1/2" compact pumps feature big performance in a small package. With flow rates up to 14.4 GPM (54.5 LPM) and a wide range of material and porting configurations.

Ratio:	1:1
Maximum Flow gpm (lpm):	14.4 (54.5)
Displacement per cycle gal (l):	.039 (.15)
Air Inlet: (Female)	1/4 - 18 PTF SAE Short
Fluid Inlet/Outlet:	1/2 - 14 NPTF - 1 Rp 1/2 (1/2 -14 BSP, parallel)
Max. operating pressure psi (bar):	100 (6.9)
Suspended solids max. dia in (mm):	.09375 (2.4)
Weight lbs (kg):	PD05P-XDS-XXX-B 6.3 (2.9) PD05P-XES-XXX-B 6.7 (3.0) PD05P-XKS-XXX-B 6.8 (3.1) PD05P-XLS-XXX-B 7.2 (3.3) PD05P-XPS-XXX-B 5.2 (2.4) PD05P-XRS-XXX-B 5.4 (2.5)
Maximum dry suction lift ft (m):	15.0 (4.5)
Sound Level:	70 PSI 60 Cycles/Min 75.0 db(A)
Muffler:	Integral, Included

PD05P-ARS-PAA

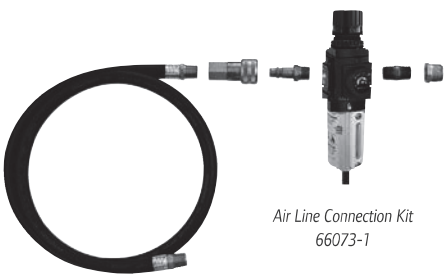
Ordering

Position	1	2		3	4	5		6	7	8		9		10	11
Example:	PX05	P	-	X	X	S	-	X	X	X	-	B	-	X	X

Position 1 Model Series	Position 2 Center Section	Position 3 Connections	Position 4 Manifold Material	Position 5 Hardware	Positon 6 Seat Material	Position 7 Ball Material	Position 8 Diaphragm Material	Position 9
D - Standard E - Remote Actuation Capable	P - Poly-propylene	A - 1/2 - 14 NPTF - 1 B - Rp 1/2 (1/2 -14 BSP, parallel)	D - Ground. Acetal (single port) E - Ground. Acetal (multiple port) K - PVDF (single port) L - PVDF (multiple port) P - Polypropylene (single port) R - Polypropylene (multiple port)	S - Stainless Steel	D - Acetal K - PVDF P - Poly-propylene S - Stainless Steel	A - Santoprene C - Hytrel* G - Nitrile S - Stainless Steel T - PTFE U - Polyurethane V - Viton	A - Santoprene C - Hytrel* G - Nitrile L - Long-Life PTFE T - PTFE/ Santoprene U - Polyurethane V - Viton	Revision Level **Position 10 & 11 Specialty Code** Fluid control options for pump with electronic interface (PE05 model). See complete description on page 13

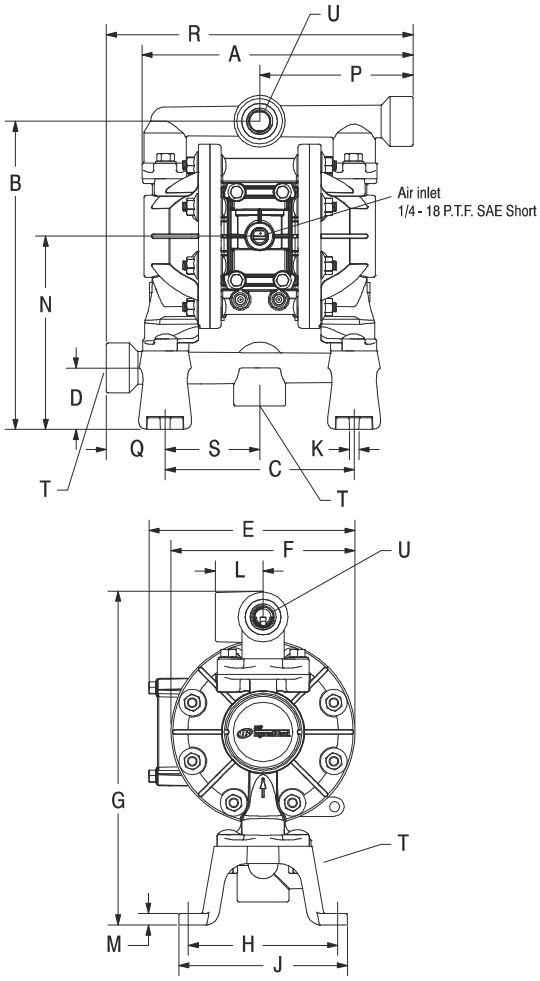
Accessories

Air Line Connection Kit | 66073-1
(Piggyback Filter/Regulator with gauge, pipe nipple and 5-foot air hose)
Cycle Counter Kit | 66975
Wall Mount Bracket Kit | 76763
Optional Muffler | 93110 used with 637438 kit
Service Repair Kits | 637428 (air section)
637427-XX (fluid section)



Air Line Connection Kit 66073-1

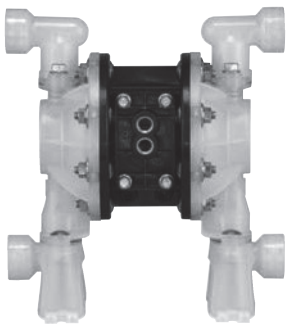
1/2" Non-Metallic Dimensions and Flow Charts



DIMENSIONS

A 8-27/32" (224.3 mm)	G 10-7/8" (275.7 mm)	N 6-5/16" (159.9 mm)
B 10-1/16" (255.0 mm)	H 4-7/8" (123.8 mm)	P 5" (127.0 mm)
C 6.164" (156.6 mm)	J 5-1/2" (139.7 mm)	Q 1-59/64" (48.8 mm)
D 2" (50.8 mm)	K 5/16" (8.0 mm)	R 10" (254.0 mm)
E 6-23/32" (170.6 mm)	L 1-9/16" (39.7 mm)	S 3-3/32" (78.3 mm)
F 6" (152.4 mm)	M 3/8" (9.5 mm)	

Model	"T" Material Inlet	"U" Material Outlet
PD05P-AXS-XXX-B	1/2 - 14 N.P.T.F. - 1	1/2 - 14 N.P.T.F. - 1
PD05P-BXS-XXX-B	Rp 1/2 (1/2 - 14 BSP)	Rp 1/2 (1/2 - 14 BSP)

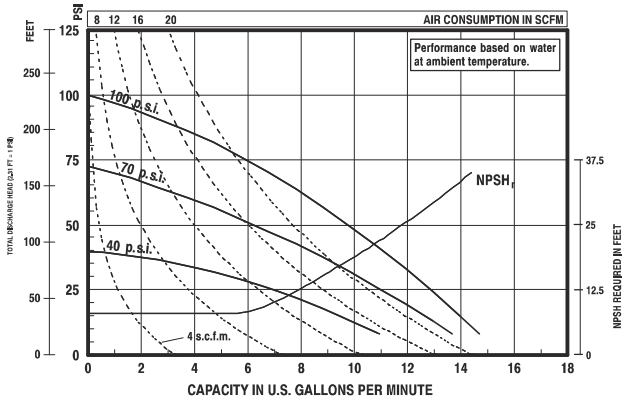


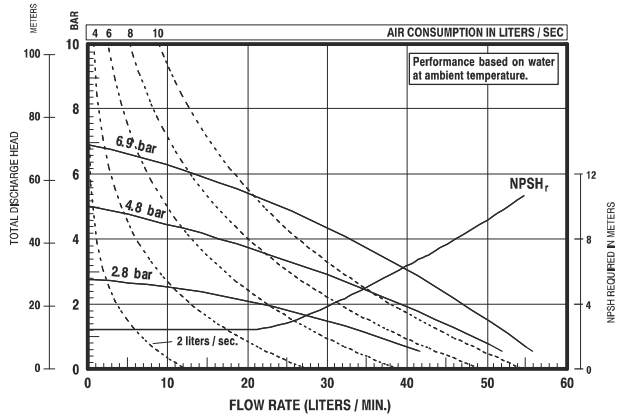
PE05P-APS-PAA-B0S with 637440-1 Kit

Dual Inlet/Outlet Kits:
637440-1 (N.P.T. Poly)
637440-4 (BSP Poly)
637440-2 (N.P.T. Acetal)
637440-5 (BSP Acetal)
637440-3 (N.P.T. PVDF)
637440-6 (BSP PVDF)

PERFORMANCE CURVES

PD05P-XXS-XXX-B 1/2" NON-METALLIC DIAPHRAGM PUMP





Refer to www.AROzone.com for full size flow curves.
For additional information contact technical support at 1.800.495.0276

Ordering Position 10

Specialty Code 1 (Blank if no Specialty Code)

A - Solenoid 120VAC
B - Solenoid 12VDC
C - Solenoid 240VAC
D - Solenoid 24VDC
E - 12vDC NEC/CEC
F - 24vDC NEC/CEC
G - Solenoid 12VDC ATEX/IECex
H - Solenoid 24VDC ATEX/IECex
J - 120VAC NEC/CEC
K - Solenoid 220VAC ATEX/IECex
N - Solenoid with no coil
0 - Standard Valve Block (No Solenoid)

Ordering Position 11

Specialty Code 2 (Blank if no Specialty Code)

E - End of stroke feedback + Leak Detection
F - End of stroke feedback
G - End of Stroke ATEX/IECex/NEC/CEC
H - End of Stroke/Leak Detection ATEX/IECex/NEC/CEC
L - Leak Detection
M - Leak Detection ATEX/IECex/NEC/CEC
0 - No Option

Novaflex 4710

UHMW Chemical Suction & Discharge Hose

A lightweight flexible chemical transfer hose designed for almost every common industrial chemical used in industry today. Non-staining UHMW tube.

***WARNING!!**

Construction:

Tube: Clear Ultra High Molecular Weight polyethylene.
Reinforcement: Multiple plies of high tensile textile with dual helix
Cover: Green abrasion resistant green EPDM (Available in blue, yellow black and grey, white - with 400ft order)
Length: 100 ft.
Temperature Range: up to -40°F (-40°C) to +250°F (+121°C)
Consult chemical resistant chart. Not for steam service. Can be open end steam cleaned

Part No.	I.D.	O.D	MBR (in)	VAC (Hg)	Plies	WP psi	WT LBS/FT
4710CU-00750-00	¾	1.30	5	29"	2	300	.40
4710CU-01000-00	1	1.55	5	29"	2	300	.50
4710CU-01500-00	1½	2.06	7	29"	2	300	.92
4710CU-02000-00	2	2.66	10	29"	2	300	1.55
4710CU-03000-00	3	3.75	12	29"	2	300	2.30

WARNING!** *Elevated temperatures can change the chemical resistance rating of 4710. Check the chemical resistance charts published by Novaflex to verify that the chemical to be transferred is rated for use with the UHMWP tube at the temperature & concentrations listed. Most chemicals become more aggressive the higher the temperature, reducing the ability of the tube material to withstand them. Compatibility information is available from Novaflex. If no data exists, it is the users responsibility to determine if the hose is compatible with the chemical to be transferred.* ***Never use Novaflex 4710 above the ratings listed by Novaflex.

When coupling chemical and higher risk hoses, Novaflex® recommends the use of crimp couplings using interlocking crimp ferrules.

Novaflex 4800 / 4878

Novaflex 4800 Red Smooth Nitrile Cover
Novaflex 4878 Black Smooth Nitrile Cover
Viton Acid Suction Hose

Recommended for transfer of acid, solvents and chemicals either by pressure or gravity flow. Used as chemical transfer hose for loading tank cars, transport trucks and storage tanks.

Construction:

Tube: Viton® chemical and heat resistant rubber
Reinforcement: Plies of polyester tire cord with helix wire
Cover: Smooth black weather and abrasion resistant nitrile rubber
Length: 100 ft.
Temperature Range: -30°F (-35°C) to +250°F (+121°C)
Consult chemical resistance chart. Not for steam service, can be open end steam cleaned

Part No.	I.D.	O.D	Plies	WP psi	MBR	WT LBS/FT
XXXXBV-01000-00	1	1.59	2	200	4	0.69
XXXXBV-01250-00	1¼	1.86	2	200	6	0.83
XXXXBV-01500-00	1½	2.13	2	200	6	1.06
XXXXBV-02000-00	2	2.83	2	200	8	1.42
XXXXBV-02500-00	2½	3.20	2	200	10	1.73
XXXXBV-03000-00	3	3.70	2	200	12	2.21
XXXXBV-04000-00	4	4.76	4	200	16	3.46

When coupling chemical and higher risk hoses, Novaflex® recommends the use of crimp couplings using interlocking crimp ferrules.

Novaflex 4801 / 4879

Viton® Acid Discharge Hose
Novaflex 4801 Red Smooth Nitrile Cover
Novaflex 4879 Black Smooth Nitrile Cover

Used as a discharge hose for highly corrosive chemicals.

Construction:

Tube: Viton® chemical and heat resistant rubber.
Reinforcement: Plies of polyester tire cord.
Cover: Black, weather resistant nitrile rubber.
Length: 100 ft.
Temperature Range: -30°F (-35°C) to +250°F (+121°C)
Consult chemical resistance chart. Not for steam service, can be open end steam cleaned.

**Viton® is a registered trade mark of DuPont*

Part No.	I.D.	O.D.	Plies	WP psi	WT LBS/FT
XXXXBV-01000-00	1	1.44	2	200	0.60
XXXXBV-01250-00	1¼	1.70	2	200	0.73
XXXXBV-01500-00	1½	2.00	2	200	0.86
XXXXBV-02000-00	2	2.54	4	200	1.38
XXXXBV-02500-00	2½	3.04	4	200	1.69
XXXXBV-03000-00	3	3.58	4	200	1.99
XXXXBV-04000-00	4	4.58	4	150	3.07

When coupling chemical and higher risk hoses, Novaflex® recommends the use of crimp couplings using interlocking crimp ferrules.

APPENDIX H
BMC FACILITY RELEASE NOTIFICATION REPORT FORM

BARNHARDT MANUFACTURING COMPANY
BEST MANAGEMENT PRACTICE PLAN
Spill Incident Report Form

BMC employees shall complete this Spill Incident Report Form for any type of petroleum product or hazardous materials / waste spill or incident at the Facility. Keep a copy of this report with the Facility SPCC, SWPPP and/or BMP Log.

Person Reporting Spill or Incident	
Name:	Other:
Date:	
Title:	
Telephone:	
Signature:	

Type of Spill:			
Common Name of Spilled Substance:			
Estimated Quantity Spilled:			
Estimated Concentration:			
Date of Spill:			
Time Spill Started:	AM / PM	Time Spill Ended:	AM / PM

Describe the conditions and extent of the release/spill at the Facility (include the weather conditions at the time of the release/spill event):

BARNHARDT MANUFACTURING COMPANY
BEST MANAGEMENT PRACTICE PLAN
Spill Incident Report Form

Actions taken to contain spill or impact of incident:

Actions taken to clean up spill or recover from incident:

BARNHARDT MANUFACTURING COMPANY
BEST MANAGEMENT PRACTICE PLAN
Spill Incident Report Form

Actions taken to manage cleanup materials:

Actions taken to prevent recurrence:

BMC Personnel responsible for managing spill response:	
Name	Signature
Phone	Title

Spill Notification List

Provide a complete list of the person(s), companies and/or agencies notified of this release event.

Name of Agency, Entity, Company or Regulator Notified of Facility Spill Incident	Date and Time of Notification	BMC Person Providing Notification

Spill Reporting Information

Where is the spill?	
What spilled?	
How much spilled?	
How concentrated is the spilled material?	
Who spilled the material?	
Is anyone cleaning up the spill?	
Are there resource damages?	
Who is reporting the spill?	
Your contact information	
Other Salient Spill and/or Facility Information:	